INTERNATIONAL CRITICAL TABLES
OF
NUMERICAL DATA
PHYSICS, CHEMISTRY AND TECHNOLOGY

VOLUME IV

INTERNATIONAL CRITICAL TABLES
OF
NUMERICAL DATA,
PHYSICS, CHEMISTRY AND TECHNOLOGY

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SYSTEME OHNE DAMPFPHASE

SISTEMI SENZA FASE GASSOSA

ABBREVIATIONS, SYMBOLS, AND CONVENTIONS

The crystal phases (Bodenkörper) are indicated on the central line and apply to all the succeeding values until a new phase is indicated. ? indicates phase not definitely determined. In the composition column, solid state, two values

Les phases cristallines (Bodenkörper) sont indiquées sur la ligne centrale et se rapportent à toutes les valeurs successives, jusqu'à ce qu'une nouvelle phase soit indiquée. ? signifie une phase non déterminée d'une façon définie. Dans

Die Bodenkörper sind längst der Mitte angegeben und beziehen sich auf alle folgende Werte bis zur nächst angegebenen Phase. ? bedeutet, dass die Phase nicht genügend bestimmt ist. In der die Zusammensetzung angebende Colonne für

Le composizioni delle fasi cristalline (corpi di fondo) sono riportate nella linea centrale, e ognuna si riferisce a tutti i valori che seguono fin dove si trova indicata una fase nuova. ? indica una fase non determinata in modo preciso. Nella

separated by a dash indicate that all intervening values are included.

Congruent melting points of molecular compounds are printed in bold-face type.

B. P. Boiling point.
Crit. Critical point.
E Eutectic point.
M Mole.
m Values in the metastable regions.
max. Maximum.
min. Minimum.
Mix. (resp. Mix_1, Mix_2) Mixed crystals. Where the composition of the mixed crystal is determined it is given in the left-hand composition column. Mix. + liq. indicates coincidence of solidus and liquidus.

M. P. Melting point.
t_L (resp. t_S) Temperature at which crystallization begins (resp. ends). All temperatures are t_L unless otherwise noted.
$t_{Tr.}$ Temperature of transition.

$\Delta t°$ Lowering of M. P. of A (resp. B) produced by B (resp. A) in solution.

Trip. Triple point.

U Transformation temperature or incongruent melting point.
Vis. Viscous solutions which solidify to glasses.

Vol. Volume.
Wt. Weight.
% per cent.
↓ A vertical arrow indicates that a linear relation holds over the range so designated.

( ) Values within parentheses are estimated.

la colonne des compositions, état solide, un trait séparant deux valeurs indique que toutes les valeurs qui interviennent sont incluses.

Les points de fusion des combinaisons moléculaires sont imprimés en caractères gras.

B. P. Point d'ébullition.
Crit. Point critique.
E Point eutectique
M Mol. gr.
m Valeurs dans les régions métastables.
max. Maximum.
min. Minimum.
Mix. (resp. Mix_1, Mix_2) Cristaux mixtes. Lorsque la composition des cristaux mixtes a été déterminée, celle-ci est donnée dans la colonne des compositions à gauche. Mix. + liq. indique la coincidence du solidus avec le liquidus.
M. P. Point de fusion.
t_L (resp. t_S) Température à laquelle la cristallisation commence (resp. finit). Toutes les températures sont t_L à moins d'une autre indication.
$t_{Tr.}$ Température de transition.
$\Delta t°$ Abaissement du M. P. de A (resp. de B) produit par l'introduction de B (resp. de A) dans la solution.
Trip. Point triple.

U Température de transformation ou point de fusion incongruent.
Vis. Solutions visqueuses qui se solidifient en donnant des verres.
Vol. Volume.
Wt. Poids.
% Pour cent.
↓ Une flèche verticale indique qu'il existe une relation linéaire dans tout l'intervalle ainsi désigné.
( ) Les valeurs entre parenthèses sont des valeurs estimées.

den festen Zustand, drücken zwei durch einen Strich getrennte Angaben aus, dass alle dazwischen liegenden Werte eingeschlossen sind.

Kongruente Schmelzpunkte molekularer Verbindungen sind durch hervorgehobenen Druck gekennzeichnet.
B. P. Siedepunkt.
Crit. Kritischer Punkt.
E Eutektischer Punkt.
M Mol.
m Werte im metastabilen Gebiet.
max. Maximum.
min. Minimum.
Mix. (bezw. Mix_1, Mix_2) Mischkristalle. Ist die Zusammensetzung der Mischkristalle bestimmt, so ist dies in der linken Colonne, welche die Zusammensetzung angiebt, verzeichnet. Mix. + liq. zeigt Koinzidenz der festen und flüssigen Phase an.
M. P. Schmelzpunkt.
t_L (bezw. t_S) Temperatur bei welcher die Kristallisation beginnt (bezw. endet). Alle Temperaturen sind t_L wenn nichts anderes bemerkt.
$t_{Tr.}$ Umwandlungs-Temperatur.
$\Delta t°$ Schmelzpunktserniedrigung von A (bezw. B) durch B (bezw. A) in der Lösung.

Trip. Tripelpunkt.

U Transformations-Temperatur oder inkongruenter Schmelzpunkt.
Vis. Viskose Lösungen, welche zu Gläsern erstarren.

Vol. Volumen.
Wt. Gewicht.
% Prozente.
↓ Ein vertikaler Pfeil steckt das Gebiet linearer Abhängigkeit ab.

( ) In Klammer gesetzte Werte sind Schätzungen.

colonna delle composizioni dello stato solido, due valori separati da una lineetta, stanno a significare che sono pure compresi tutti i valori intermedi.

I punti di fusione congruenti dei composti molecolari sono stampati in grassetto.

B. P. Punto di ebollizione.
Crit. Punto critico.
E Punto eutettico.
M Grammimolecole.
m Valori nelle regioni metastabili.
max. Massimo.
min. Minimo.
Mix. (risp. Mix_1, Mix_2) Cristalli misti. Quando si conosce la composizione dei cristalli misti essa è indicata nella colonna delle composizioni a sinistra. Mix + liq. significa coincidenza del solidus e del liquidus.

M. P. Punto di fusione.
t_L (risp. t_S) Temperatura alla quale comincia (o finisce) la cristallizzazione. Tutte le temperature sono t_L quando non è indicato diversamente.
$t_{Tr.}$ Temperatura di transizione.
$\Delta t°$ Abbassamento del punto di fusione di A (o B) prodotto da B (o A) in soluzione.

Trip. Punto triplo.

U Temperatura di trasformazione oppure punto di fusione incongruente.
Vis. Soluzioni viscose che solidificano formando vetri.

Vol. Volume.
Wt. Peso.
% Percento.
↓ Una freccia verticale significa che esiste una relazione lineare in tutto l'intervallo così indicato.
( ) I valori fra parentesi sono apprezzati.

TRIPLE POINTS, TRANSITION POINTS AND MELTING POINTS AT ORDINARY AND LOW PRESSURES[1]

H. W. Foote

INTRODUCTION

The following triple points are possible: (1) Crystal—liquid—vapor. (2) Crystal—crystal—vapor. (3) Crystal—crystal—liquid. (4) Crystal—crystal—crystal.

The last two types have not been found at pressures below one atmosphere. In general, the temperature at a triple point, when the pressure is less than one atmosphere, coincides within the limits of experimental error with the freezing point or the transition point. For temperature and pressure data for such triple points, the reader should therefore consult the tables of freezing points or transition temperatures (Vol. I, p. 98); and of vapor pressures (of one-component systems, Vol. III, p. 199) respectively. It has, however, been shown by Richards, Carver and Schumb (11) that the freezing point of benzene saturated with air at a pressure of one atmosphere is 0.003° lower than the temperature at the triple point (5.496° and 35.4 mm). The temperature commonly given for the corresponding triple point of water (0.0075°) is based only upon the effect of pressure in defining the freezing point of water, 0°, and takes no account of the effect of dissolved air at atmospheric pressure. If the latter effect (0.0023°) is taken into account in defining the freezing point of water, the temperature of the triple point is +0.0098°C.

ONE-COMPONENT SYSTEMS

Melting Points Known with a Probable Accuracy of ±0.05°

For the purpose of this table, the *melting point* is defined as the temperature on the I. C. T. scale (*v.* Vol. I, p. 53), at which the crystalline and liquid phases are in equilibrium with dry air at a pressure of one atmosphere. Richards, Carver and Schumb (11) have shown that dissolved air, at a pressure of one atmosphere, lowers the freezing point of benzene 0.031°, so that the freezing point is lower by this amount than would be the case if the pressure were applied by a piston or an insoluble gas. The standard temperature of the melting point of ice, as usually determined, may also be slightly uncertain depending on the extent to which the water is saturated with air. The lowering in freezing point due to the solubility of the air in this case amounts to about 0.0023°. The melting points of all compounds in the following list were taken in air, but saturation with air was demonstrated only in the case of benzene. As it has been repeatedly shown that saturation of a liquid with air takes place rather rapidly when there is thorough contact between the two, the possible error in melting point from incomplete saturation is probably not greater than the other errors of experiment.

The table gives a list of melting points which appear to be known, with reasonable certainty, within ±0.05°. The list is quite probably incomplete; but where any doubt existed as to the accuracy of a result, it has not been included. For numerous melting points which are probably nearly as good, *see* de Visser (18), Block (3), and especially Timmermans (13, 14, 15, 16).

When more than one reference is given in the table, the melting point adopted is the weighted average of the data to which reference is made. No references are given to data which were not actually used, though nearly every melting point given has been determined repeatedly with considerable accuracy. Except for water, the melting point of benzene is probably the most accurately known.

[1] Except "soaps" for which *v.* final index, and high melting oxides and other refractory substances, for which *v.* p. 83.

Name	Formula	M. P., °C	Lit.
Acetic acid	CH_3COOH	16.60	(4, 17)
Acetophenone	$CH_3COC_6H_5$	19.655	(10)
Benzene	C_6H_6	5.493 ±0.01	(11)
α-Bromonaphthalene	$C_{10}H_7Br$	6.20	(7)
1, 2-Dibromomethane	$C_2H_4Br_2$	9.99	(2, 9)
Formic acid	HCOOH	8.39	(6)
Nitrobenzene	$C_6H_5NO_2$	5.67	(12)
Sulfuric acid	H_2SO_4	10.49	(5)
Sulfuric acid (monohydrate)	$H_2SO_4.H_2O$	8.62	(5)
Sulfur trioxide	SO_3	16.83	(1, 8)

LITERATURE

(For key to the periodicals see end of volume)

(1) Berthoud, *42*, **20**: 77; 23. (2) Biron, *7*, **81**: 590; 13. (3) Block, *7*, **82**: 403; 13. (4) Bousfield and Lowry, *4*, **99**: 1432; 11. (5) Brönsted, *7*, **68**: 693; 10. (6) Ewins, *4*, **105**: 350; 14. (7) Jones and Lapworth, *4*, **105**: 1804; 14. (8) Lichty, *1*, **34**: 1440; 12. (9) Moles, *7*, **80**: 531; 12.
(10) Morgan and Lammert, *1*, **46**: 881; 24. (11) Richards, Carver and Schumb, *1*, **41**: 2019; 19. (12) Roberts and Bury, *4*, **123**: 2037; 23. (13) Timmermans, *28*, **25**: 300; 11. (14) Timmermans, *28*, **27**: 334; 14. (15) Timmermans, *28*, **30**: 62; 21. (16) Timmermans, Horst and Onnes, *18*, **6**: 180; 23. (17) de Visser, *70*, **12**: 101; 93. (18) de Visser, *70*, **17**: 182; 98.

Transition Temperatures

For the purpose of these tables, the term *transition temperature* refers to the temperature at which two crystalline forms of a substance are in equilibrium at a pressure of one atmosphere. This temperature coincides, within the limits of experimental error, with the triple point, crystal—crystal—vapor, when the vapor pressure in the latter system does not differ greatly from one atmosphere. In the tables, the transition temperatures given are the weighted averages of values, references to which are given by numbers. No references are given to data which were not used in obtaining the values in the tables. Where the number of determinations is sufficient, the weighted average deviation is given under the heading "±°C." Where this is not significant, a probable accuracy or reliability has been indicated.

Transition temperatures of molecular compounds such as double salts or salts with water of crystallization have, of course, only been included when the compounds behave as one-component systems, *i.e.*, when there is no change in composition of the phases at the transition point.

A-Table, Non-Metallic Elements

For the metallic elements, *v.* Vol. II, p. 458

Formula	$t_{Tr.}$, °C	±, °C	Lit.	Formula	$t_{Tr.}$, °C	±, °C	Lit.
I_2	47	*	(73)	O_2	−240	*	(95)
N_2	−237	>5	(65)	P	− 77	<5	(24)
O_2	−225	>5	(95)	S	95.5	0.1	(72, 101)

* Existence of transition uncertain.

B-Table, Chemical Compounds

Standard arrangement, *v.* Vol. I, p. 96

(Except oxides of Al, Ba, Fe, Mg, Ra, Ca, Sr, Zr, Si, the rare earths and their combinations with one another, for which *see* p. 83.)

B-Table, Chemical Compounds.—(*Continued*)

Formula	$t_{Tr.}$, °C	±, °C	Lit.
SO_3			(120.5)
NH_4NO_3	−17	<5	(7, 126, 133)
	32.2	0.2	(22, 30, 32, 85, 86, 126)
	50.5m	0.5	(19.5)
	83.9	<1	(22, 32, 126, 140)
	125.3	0.2	(12, 22, 32, 116, 126, 140)
NH_4Cl	184.3	<1	(23, 51, 113, 119)
NH_4ClO_4	240	>5	(127)
NH_4Br	137.4	<1	(114, 118)
NH_4I	−17	<1	(23, 114)
$(NH_4)_3H(SO_4)_2$	134	>5	(37)
As_2S_2	267	>5	(19)
As_2S_3	170	>5	(19)
$SbCl_3$	65	<5	(66)
	69.5	<5	(66)
Bi_2O_3	704	<5	(50)
NH_4CNS	90	<5	(21, 46, 129)
	120	*	(129)
For other carbon compounds belonging here, *v.* the C-Table			
$(C_3H_7NH_3)_2SnCl_6$	186	>5	(104)
$[NH_2(C_2H_5)_2]_2SnCl_6$	146	*	(104)
SiO_2, *v.* p. 19			
PbO	587	*	(60)
$PbSO_4$	854	4	(26, 38, 47, 60, 115)
$PbSO_4.2PbO$	450	*	(60)
$3Pb_3(PO_4)_2.PbCl_2$, pyromorphite (artificial)	670	>5	(35)
$3Pb_3(AsO_4)_2.PbCl_2$, mimetite (artificial)	395	>5	(35)
$TlClO_4$	226	>5	(127)
TlI	173	<5	(43, 84)
$TlNO_3$	75	1.8	(22, 34, 46, 133)
	145	1.5	(22, 33, 34, 46)
$TlOC_6H_2(NO_2)_3$, thallium picrate	46	<1	(99)
ZnS	1020	<5	(1)
$ZnSO_4$	740	>5	(38)
HgI_2	127.4	0.4	(21, 90, 102, 109, 120, 122)
$HgS.HCNS$	110	*	(125)
$CuBr$	384	<5	(27, 54, 84)
CuI	401	2	(54, 84, 98)
Cu_2S	91	<5	(97)
Cu_2Se	110	*	(9)
Cu_2Te	351	>5	(29)
	387	>5	(29)
Cu_4Te_3	365	>5	(29)
$AgClO_4$	158	>5	(127)
$AgBrO_3$	98.5	<1	(100)
AgI	145.8	1	(21, 70, 79, 84, 98, 111, 116, 122, 124)
Ag_2S	177	<5	(40, 58, 83, 110)
Ag_2SO_4	411	<5	(38, 88)
Ag_2Se	133	<5	(8, 9)
$AgNO_3$	159.6	0.1	(22, 56, 116, 140)
$[NH_2(CH_3)_2]_2PtCl_6$	10	*	(75)
$[NH_3(iso\text{-}C_3H_7)]_2PtCl_6$	32	<5	(103, 123)
$[NH_2(C_2H_5)_2]_2PtCl_6$	144	*	(104)

Formula	$t_{Tr.}$, °C	±, °C	Lit.
$[NH(C_2H_5)_2CH_3]_2PtCl_6$	62	*	(104)
	122	*	(104)
$[NH_2(C_3H_7)_2]_2PtCl_6$	89	*	(104)
$[NH(C_3H_7)_2C_2H_5]_2PtCl_6$	107	>5	(103)
$[NH(C_3H_7)_3]_2PtCl_6$	59	*	(104)
	142	*	(104)
$[N(C_3H_7)_4]_2PtCl_6$	108	*	(104)
	201	*	(104)
$MnSO_4$	860	>5	(38)
FeS	298	>5	(78)
Fe_2P	80	*	(76)
Fe_3P	440	*	(76)
Ni_3S_2	550	>5	(18, 39)
$CrCl_2.4H_2O$	38	<5	(69)
$PbCrO_4$	707	>5	(60)
	783	>5	(60)
$2PbCrO_4.5PbO$	744	*	(60)
$PbWO_4$	877	>5	(60)
$3Pb_3(VO_4)_2.PbCl_2$, vanadinite (artificial)	710	>5	(35)
$AlBr_3$	70	<5	(66)
$MgF_2.Mg_3P_2O_8$, wagnerite	845	>5	(138)
$6MgO.8B_2O_3.MgCl_2$, boracite	266	<5	(52, 81, 116)
$CaSO_4$	1193	>5	(47)
$CaCO_3$	970	*	(13)
$SrSO_4$	1152	>5	(47)
$SrCO_3$	908	>5	(16, 108)
$BaCl_2$	925	2	(42, 71, 96, 109, 112, 128)
$Ba(ClO_4)_2$	284	>5	(127)
$BaSO_4$	1149	>5	(47)
$BaCO_3$	806	5	(14, 16, 41, 74, 108)
$LiClO_3$, *v.* p. 233	982	>5	(16)
Li_2SO_4	576	4	(57, 87, 88, 129)
$NaOH$	300	<5	(55)
$NaClO_4$	158	>5	(127)
Na_2SO_4	236	3	(15, 25, 57, 61, 63, 67, 87, 88, 129, 139)
$Na_2SO_4.NaF$	105	<5	(139)
$Na_4P_2O_7$	387	*	(107)
	520	*	(107)
$Na_2HPO_4.12H_2O$	29.6	<1	(53)
Na_2CO_3	450	>5	(57)
Na_2MoO_4	424	>5	(15, 49, 57, 67)
	585	>5	(15, 49, 67)
	623	>5	(15, 49, 67)
Na_2WO_4	580	>5	(15, 68, 93)
	589	<5	(15, 68, 93)
Na_3AlF_6, cryolite	568	>5	(36, 89)
$Na_2O.Al_2O_3.2SiO_2$, nephelite	1150	>5	(44)
KOH	248	<5	(55)
$KClO_3$	255	>5	(37)
$KClO_4$	300	<5	(127)
K_2S	146.4	<5	(21)
K_2SO_4	588	5	(4, 47, 48, 57, 64, 67, 87, 88)
$KHSO_4$	164.2	<5	(23)
	180.5	<5	(23)

* Existence of transition uncertain.

𝔅-Table, Chemical Compounds.—(*Continued*)

Formula	$t_{Tr.}$, °C	±, °C	Lit.
KNO_3	127.8	1.1	(10, 11, 22, 34, 56, 132, 133)
	147	*	(62)
KPO_3	450	>5	(3)
$K_4P_2O_7$	278	>5	(3)
K_2CO_3	410	>5	(57)
KCNS	143	<5	(21, 46, 129)
$K_2SO_4.PbSO_4$	544	>5	(47)
$2KI.CdI_2$	215	>5	(20)
$K_2Ni(C_2S_2O_2)_2$	20	>5	(105)
K_2CrO_4	666	<5	(4, 48)
$K_2Cr_2O_7$	237	<5	(107, 141)
K_2MoO_4	327	<5	(67)
	454	<5	(67)
	477	<5	(4, 67)
K_2WO_4	388	>5	(67)
	575	*	(4)
$K_2SO_4.2CaSO_4$	937	>5	(47, 87)
$K_2SO_4.2SrSO_4$	775	>5	(47)
$LiKSO_4$	435	>5	(88)
RbOH	245	>5	(55)
$RbClO_4$	279	>5	(127)
Rb_2SO_4	653	<5	(57, 87)
$RbNO_3$	163.5	<5	(22, 116, 133)
	219	<5	(116, 133)
$Rb_2SO_4.2CaSO_4$	787	>5	(87)
	915	>5	(87)
$LiRbSO_4$	142	>5	(87)
CsOH	223	<5	(55)
CsCl	451	>5	(142)
$CsClO_4$	219	>5	(127)
Cs_2SO_4	660	>5	(87)
$CsNO_3$	153.5	<5	(22, 46, 133)
$Cs_2SO_4.2CaSO_4$	722	>5	(87)

* Existence of transition uncertain.

ℭ-Table, the ℭ-Arrangement

Comparatively few transition temperatures of C-compounds are known, and most of them are quite inaccurate or uncertain. From the study of a large number of compounds, Schaeling (*Diss.*, Marburg, 1910) has concluded that polymorphous organic compounds are usually monotropic and that enantiotropy is rare.

For "liquid crystals," *v.* Vol. I, p. 314.

Formula	Name	$t_{Tr.}$, °C	±, °C	Lit.
CBr_4	Carbon tetrabromide	46.9	<1	(21, 66, 106, 118)
CCl_4	Carbon tetrachloride	−45	>5	(45)
C_2H_8BrN	Ethylamine hydrobromide	83	*	(80)
C_2H_8ClN	Ethylamine hydrochloride	80	*	(80)
$C_2Br_2Cl_4$	Dibromotetrachloroethane	80	>5	(46)
		109	>5	(46)
C_2Cl_6	Hexachloroethane	45	<5	(21, 116, 123)
		71.3	0.4	(21, 94, 116, 123)
		125	*	(94)
$C_3H_4O_4$	Malonic acid	94	*	(136)
$C_4H_{12}ClNO_4$	Tetramethylammonium perchlorate	355	*	(127)
$C_6H_4Br_2$	*p*-Dibromobenzene	8.5	*	(6)
$C_6H_4Cl_2$	*p*-Dichlorobenzene	25	*	(134)
		29	*	(134)
$C_6H_8N_2O_3$	Aniline nitrate	98	>5	(137)
C_7H_7NO	α-Benzaldoxime	−28	*	(6)
C_7H_9N	*p*-Toluidine	22	*	(6)
$C_8H_9NO_2$	α-Anisaldoxime	20	*	(6)
$C_8H_9NO_2$	α′-Anisaldoxime	13	*	(6)
$C_{10}H_8O$	α-Naphthol	49	*	(6)
$C_{10}H_9N$	α-Naphthylamine	13.5	*	(6)
$C_{10}H_{13}NO$	Butyric anilide	16	>5	(5)
$C_{10}H_{15}ClO$	Camphor monochloride	74	<5	(92, 136)
$C_{10}H_{16}O$	Camphor	−32	>5	(23, 135)
$C_{10}H_{16}O$	Camphor	90	<5	(23, 135)
$C_{13}H_{10}N_4O_5$	*m*-Dinitrodiphenylcarbamide	55	*	(91)
		180	*	(91)
$C_{14}H_{10}Cl_4$	1, 1, 2, 2-Tetrachloro-1, 2-diphenylethane	100	*	(77)
$C_{14}H_{10}N_2O_2$	Phthalylphenylhydrazide	9.4	<1	(28)
$C_{14}H_{13}NO$	*o*-Hydroxy-*m*-methylbenzylidencanilide	31	>5	(59)
$C_{15}H_{12}N_2O_2$	Phthalylphenylmethylhydrazide	55.1	<1	(27)
$C_{16}H_{18}N_2O_2$	*p*-Azophenetole	95.5	<5	(17, 31)
$C_{20}H_{17}NO_3S$	α-Naphthylamine naphthalene-α-sulfonate	66	†	(131)
$C_{20}H_{17}NO_3S$	α-Naphthylamine naphthalene-β-sulfonate	54	†	(131)
$C_{27}H_{46}O$	Cholesterol	43	>5	(82)

* Existence of transition uncertain.

† This transition temperature undoubtedly exists, but it is uncertain whether the system is of 1 or 2 components.

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EFFECT OF PRESSURE UPON MELTING AND TRANSITION POINTS; VOLUME CHANGE ON MELTING AND TRANSITION; DIRECTLY MEASURED COMPRESSIBILITY- AND THERMAL EXPANSION-DIFFERENCES

P. W. Bridgman

INTRODUCTION

Units.—Throughout the following tables the pressure unit is the normal atmosphere; the temperature unit, the absolute centigrade degree; and all volume changes, unless otherwise indicated, are expressed in cm³/kg.

Abbreviations and Conventions.—The liquid phase is indicated by "L," and solid phases by the Roman numerals I, II, etc. In cases where the observed melting point at one atm. is less than the I. C. T. normal M. P. (*v.* Vol. I), the I. C. T. value is inserted in brackets for comparison.

Latent Heat.—The latent heat of any phase change may be calculated from the equation:

$$l\left(\frac{\text{joule}}{\text{kg}}\right) = T\Delta V\,\frac{dP}{dT} \times 0.10133,$$

where T is the absolute centigrade temperature, P is the pressure in atm. and ΔV is the accompanying volume change in cm³/kg. This calculation will be facilitated in many cases by reference to the original papers, where tabulated values of dT/dP are given. An approximate method for computing differences of thermal expansion and specific heat for the reacting phases may be found in (8).

INTRODUCTION

Unités.—L'unité de pression utilisée dans les tables suivantes est l'atmosphère normale; l'unité de température, le degré centigrade absolu; et tous les changements de volume sont exprimés en cm³/kg à moins d'une autre indication.

Abréviations et conventions.—La phase liquide est indiquée par "L" et les phases solides par les chiffres romains I, II, etc. Lorsque le point de fusion observé sous une atm. est inférieur au Pt. de F. normal des T. C. I. (*v.* Vol. I), la valeur des T. C. I. a été écrite entre parenthèse pour comparaison.

Chaleur latente.—La chaleur latente de chaque changement de phase peut être calculée au moyen de l'équation:

$$l\left(\frac{\text{joule}}{\text{kg}}\right) = T\Delta V\,\frac{dP}{dT} \times 0{,}10133,$$

où T est la température absolue en degrés centigrades, P est la pression en atm. et ΔV est le changement de volume produit en cm³/kg. Ce calcul sera facilité dans bien des cas si l'on se réfère aux mémoires originaux, où l'on trouvera une table donnant les valeurs de dT/dP. On trouvera à (8) une méthode approximative pour le calcul des différences dans le cas de la dilatation thermique et de la chaleur spécifique pour les phases réagissantes.

EINLEITUNG

Einheiten.—Grundsätzlich ist in den folgenden Tafeln die normale Atmosphäre die Druckeinheit, als Temperatureinheit gelten absolute Centigrade, die Volumänderungen sind (wenn nichts anderes angegeben) in cm³/kg ausgedrückt.

Abkürzungen und Festlegungen.—Die flüssige Phase ist durch "L" angezeigt, die festen Phasen durch römische Zahlen (I, II, III, . . .). In den Fällen, in denen der beobachtete Schmelzpunkt bei einer Atmosphäre niedriger ist, als der Normal-Schmelzpunkt [M. P. (Bd. I)] der I. C. T., so ist dieser letzte Wert zum Vergleich in Klammer daneben gesetzt.

Latente Wärme.—Die latente Wärme jeder Phasenänderung ergiebt sich nach der Gleichung:

$$l\left(\frac{\text{joule}}{\text{kg}}\right) = T\Delta V\frac{dP}{dT} \times 0{,}10133,$$

T = absolute Centigrad Temperatur, P = Druck in Atmosphären, ΔV ist die dabei auftretende Volumänderung in cm³/kg.

Diese Rechnung wird in vielen Fällen durch Heranziehung der in der Literatur sich vorfindenden Werte für dT/dP erleichtert. Eine angenäherte Methode zur Berechnung der Differenz der thermischen Ausdehnungen beziehungsweise der spezifischen Wärme der Phasenänderung ist in (8) zu finden.

INTRODUZIONE

Unità.—Nelle tabelle seguenti viene fatto sempre uso dell'atmosfera normale come unità di pressione, e di gradi centigradi assoluti come unità di temperatura. Tutte le variazioni di volume, tranne che non sia diversamente indicato, sono indicate in cm³/kg.

Abbreviazioni e convenzioni.—La fase liquida viene indicata con "L" e le fasi solide sono indicate con numeri romani (I, II, ecc.). Nei casi in cui il punto di fusione osservato ad un atmosfera, è più basso del punto normale di fusione [normale M. P. (*v.* Vol. I)], delle I. C. T., quest'ultimo valore, è riportato tra parentesi per confronto.

Calori latenti.—I calori latenti dei cambiamenti di fase si possono calcolare dall'equazione:

$$l\left(\frac{\text{joule}}{\text{kg}}\right) = T\Delta V\,\frac{dP}{dT} \times 0{,}10133,$$

dove T è la temperatura assoluta, P la pressione in atmosfere e ΔV è la variazione di volume in cm³/kg.

Questi calcoli sono in molti casi facilitati da richiami alla letteratura originale dove si trovano tabelle per i valori dT/dP. Un metodo approssimato per calcolare le differenze nel caso della dilatazione termica e dei calori specifici delle fasi reagenti si trova riportato in (8).

ELEMENTARY SUBSTANCES (*v.* p. 11)

CHEMICAL COMPOUNDS

Part I. Melting-Point Data Reproducible by Power Series (*v. also* Part II, p. 11)

M. P. (°C) $= t_0 + a \times 10^{-4}P - b \times 10^{-8}P^2$. Range: up to $P_{max.}$.

Example: The M. P. of formic acid at 2000 atm. is 7.8 (resp. 8.4) + (132 × 10⁻⁴ × 2000) − (85 × 10⁻⁸ × (2000)²) = 30.8° (resp. 31.4)°C.

Formula	Name	t_0 (obs.)	t_0 (I. C. T.)	a	b	$P_{max.}$	Lit.
H_3PO_4	*o*-Phosphoric acid	38.0	42.3	0.83		2600	(29)
PH_4Cl	Phosphonium chloride*†	28	26	300	165	3000	(29)
	C-Compounds, the C-Arrangement						
CHN	Hydrocyanic acid	−13.4	−14	226	157	3800	(29)
CH_2O_2	Formic acid	7.8	8.4	132	85	3000	(29)
$C_2H_4Br_2$	Ethylene dibromide†	9.9	10.0	260	133	3000	(29)
$C_3H_4Br_2O_2$	1, 2-Dibromopropionic acid	64.0	64	201		1000	(34)
	1, 2-Dibromopropionic acid, metastable	51.0	51	191		1300	
$C_4H_6O_2$	*α*-Crotonic acid	71.4	72	373		300	(16)
$C_4H_8Cl_2S$	2, 2-Dichloroethyl sulfide†	13.9	13.5	150	49	2000(?)	(1)
$C_4H_{10}O$	Trimethyl carbinol†	24.9	25.5	355	397	2700	(29)
$C_4H_{10}O_4$	*dl*-Erythritol	117.0	126	83	59	3000	(15)
$C_5H_{12}O$	Dimethylethyl carbinol†	− 8.45	−11.9	228	278	3800	(29)
$C_6H_4Cl_2$	*p*-Dichlorobenzene	52.3	52.9	275	134	3000	(6)
$C_6H_5NO_3$	*o*-Nitrophenol	44.9	45	240		300	(16)
C_7H_7Br	*p*-Bromotoluene	26.5	28	301	140	3000	(6)
C_7H_7Cl	*p*-Chlorotoluene	6.9	7.8	275	130	3000	(6)
C_7H_7I	*p*-Iodotoluene	33.9	35	314	147	3000	(6)
C_7H_7NO	Formanilide	46.6	47.5	209	153	2900	(29)
$C_7H_7NO_3$	*p*-Nitroanisole	52.5	54	244	121	3000(?)	(27)
C_7H_8O	*p*-Cresol	33.3	33.8	236	67	2900	(29)
$C_7H_8O_2$	Guaiacol	28.4	28	184	107	3000	(15)
C_8H_8O	Acetophenone	19.2	19.7	243	162	3000	(29)
C_8H_{10}	*p*-Xylene†	13.2	13.2	355	183	2900	(29)
$C_8H_{10}O_2$	Veratrole	23.3		224	108	3000	(6)
$C_{10}H_8$	Naphthalene†	79.95	80.1	376	192	3500	(16, 19, 29)
$C_{10}H_8O$	*α*-Naphthol	95.8	96	248	65	3000	(22)
$C_{10}H_9N$	*α*-Naphthylamine	48.9	50	200		300	(16, 23, 26)
$C_{10}H_{12}O$	Anethole	22.27	22.5	212	94	3000	(6)
$C_{10}H_{14}O$	Thymol	49.2	51.5	210	197	3000	(6, 16)
$C_{10}H_{20}O$	Menthol, stable	41.1	42.5	248	192	3000	(6, 16)
	Menthol, metastable	36.5	35.5	248		300	(16)
$C_{12}H_{24}O_2$	Lauric acid	42.5	48.0	238	160	3000	(29)
$C_{13}H_{10}O_3$	Salol (Phenyl salicylate)	42.0	43	298	139	3000	(15)
$C_{13}H_{12}$	Diphenylmethane	26.9	27	264	124	3000	(6)
$C_{13}H_{13}N$	Benzylaniline	35.6	37	241	115	3000	(6)
$C_{14}H_{10}O_3$	Benzoic anhydride	41.2	43	267	59	3000	(15)
$C_{14}H_{14}N_2O_3$	*p, p'*-Azoxyanisole, liquid crystal transition	117.3	117.4	303	225	3000(?)	(16, 26)
	Melting	135.9		408			(26)
$C_{14}H_{28}O_2$	Myristic acid	51.8	58	245	171	2400	(29)
$C_{16}H_{18}N_2O_3$	*p*-Azoxyphenetole, liquid crystal transition	138.5	136.9	370		300	(16)
	Melting	168.0		476		300	(16)
$C_{16}H_{32}O_2$	Palmitic acid	61.2	64	211	46	1800	(29)
$C_{17}H_{12}O_3$	Betol (*β*-Naphthyl salicylate)	93.0	95	341	335	3000	(15)
$C_{18}H_{36}O_2$	Stearic acid	68.4	69.3	258		300	(16)
$C_{19}H_{16}$	Triphenylmethane	92.8	92.5	367	267	3000	(15)
$C_{22}H_{42}O_2$	Erucic acid	31.3	33.5	213	107	3000	(29)
$C_{34}H_{50}O_2$	Cholesteryl benzoate, ordinary melting	178.3	178.5	760		300	(16)

* The triple point vapor—liquid—solid is *ca.* 28° and 46 atm.

† Volume change on melting, cm³/kg:

PH_4Cl—87 at the triple point.

$C_2H_4Br_2$—46 at 15°, 41 at 25°, 37 at 35°, 36 at 45°.

$C_4H_8Cl_2S$—54—0.0065*P*.

$C_4H_{10}O$—81.8 at 30°, 70.7 at 40°, 61.4 at 50°, 54.0 at 60°, 46.7 at 70°.

$C_5H_{12}O$—45.5 − 0.0850 (*t* + 8.5°).

C_8H_{10}—190 at 30°, 175 at 50°.

$C_{10}H_8$—145.8 − 0.688 (*t* − 80.1°). Range, ≯*t* = 140°.

NON-METALLIC ELEMENTARY SUBSTANCES

For metals, *v.* Vol. II, p. 459

H_2, Hydrogen (36)

He, Helium (17.5)

P, White phosphorus (7); *cf.* (16, 22, 29); *see* Fig. 1

P, atm.	t, °C	ΔV, cm³/kg
Liquid–I		
1	44.2	19.3
1 000	73.8	17.9
2 000	101.0	16.6
3 000	126.8	15.4
4 000	151.3	14.2
5 000	174.0	13.1
6 000	196.0	12.0
I–II		
6 000	0.1	8.46
7 000	12.5	8.29
8 000	24.5	7.92
9 000	36.0	7.64
10 000	47.2	7.37
11 000	58.0	7.10
12 000	68.4	6.84

S, Sulfur (29)

These results are uncertain because of slow internal changes

P, atm.	t, °C	ΔV, cm³/kg
L–monoclinic		
1	114.0	
180	120.0	41
510	130	40
860	140	
1240	150	
Monoclinic–rhombic		
1	96.7	
100	100	13.8
360	110	13.9
610	120	13.9
850	130	14.0
1090	140	14.0
1320	150	
Liquid–rhombic		
1630	100	
2060	170	
2550	180	
3060	190	

Triple point: 1400 atm., 153.7°C.

CHEMICAL COMPOUNDS, PART II

Standard arrangement (*v.* Vol. III, p. viii)

The temperatures are melting points unless otherwise indicated.

H_2O, Water (10); *cf.* (9, 29, 32); *see* Fig. 2

P, atm.	t, °C	ΔV, cm³/kg
L–I		
1	0.0	90.0
590	− 5.0	101.6
1 090	−10.0	112.2
1 540	−15.0	121.8
1 910	−20.0	131.3
L–III		
3 420	−17.0	23.1
2 820	−18.5	30.1
2 430	−20.0	37.1
2 045	−22.0	46.6
L–V		
6 160	0.0	52.7
5 270	− 5.0	60.3
4 360	−10.0	67.9
3 680	−15.0	75.4
3 040	−20.0	82.8
L–VI		
4 640	−15.0	98.0
5 110	−10.0	96.0
5 620	− 5.0	93.8
6 160	0.0	91.6
6 880	+ 5.0	88.4
7 390	10.0	84.4
8 040	15.0	79.8
8 710	20.0	75.1
10 250	30.0	66.3
11 990	40.0	59.0

P, atm.	t, °C	ΔV, cm³/kg
L–VI		
13 970	50.0	52.3
16 150	60.0	47.7
18 530	70.0	
20 960*	80.0	
I–II		
2 094	−35.0	217.7
2 006	−45.0	217.0
1 916	−55.0	216.2
1 826	−65.0	215.4
1 736	−75.0	214.6
I–III		
2 035	−20.0	177.3
2 087	−30.0	191.9
2 108	−40.0	199.2
2 091	−50.0	202.3
2 049	−60.0	204.9
II–III		
3 260	−25.0	14.8
2 820	−28.0	16.4
2 450	−31.0	17.9
2 160	−34.0	20.6
II–V		
3 460	−25.0	40.1
3 680	−28.0	40.1
3 880	−31.0	40.1
4 070	−34.0	40.1

* Extrapolated from 76.4°.

P, atm.	t, °C	ΔV, cm³/kg
III–V		
3 409	−20.0	54.69
3 395	−25.0	54.61
3 383	−30.0	54.54
3 358	−35.0	54.46
V–VI		
6 176	0.0	38.86
6 172	− 5.0	38.66
6 169	−10.0	38.47
6 166	−15.0	38.28
6 162	−20.0	38.09

TRIPLE POINTS AND VOLUME CHANGES

P, atm.	t, °C	Direction of volume change	ΔV, cm³/kg
III–L–I			
2 045	−22.0	III–L	46.6
		L–I	135.2
		II–I	181.8
II–III–I			
2 100	−34.7	II–III	21.5
		III–I	196.3
		II–I	217.8
V–III–L			
3 420	−17.0	V–III	54.7
		III–L	24.1
		V–L	78.8
V–II–III			
3 400	−24.3	V–II	40.1
		II–III	14.5
		V–III	45.6
VI–V–L			
6 175	0.16	VI–V	38.9
		V–L	52.7
		VI–L	91.6
L–I–vapor			
0.00602	0.0075		

NH_4NO_3 (12); *cf.* (4, 5, 14, 17, 20, 21, 29); *see* Fig. 3

P, atm.	t, °C	ΔV, cm³/kg
Liquid–I		
1	169.6	
1 000	203	*ca.* 51
I–II		
1	125.5	13.51
1 000	135.0	11.66
2 000	143.5	10.20
3 000	151.4	9.06
4 000	158.7	8.17
5 000	165.6	7.39
6 000	172.0	6.65
7 000	178.0	5.94
8 000	183.3	5.24
9 000	188.7	4.56

P, atm.	t, °C	ΔV, cm³/kg
II–III		
1	82.7	7.58
200	79.1	7.96
400	74.8	8.33
600	69.8	8.70
800	64.2	9.08
II–IV		
1 000	65.8	12.10
2 000	80.5	12.11
3 000	94.8	12.12
4 000	108.6	12.16
5 000	121.8	12.21
6 000	134.6	12.30
7 000	147.1	12.41
8 000	159.1	12.54
9 000	170.8	12.70
III–IV		
1	32.0	20.26
200	38.7	20.52
400	45.9	20.79
600	53.7	21.05
800	61.9	21.31
IV–V		
1	−18.0	*ca.* 17
I–VI		
9 000	188.9	8.33
10 000	196.6	7.67
11 000	204.4	7.30
II–VI		
8 860	170.0	3.12
8 743	185.0	3.73
VI–IV		
9 000	170.4	9.58
10 000	178.8	9.56
11 000	187.3	9.53
12 000	195.8	9.51

TRIPLE POINTS AND VOLUME CHANGES

P, atm.	t, °C	Direction of volume change	ΔV, cm³/kg
II–III–IV			
830	63.3	III–IV	21.35
		II–III	9.25
		II–IV	12.10
I–II–VI			
8730	186.7	I–II	4.75
		I–VI	8.55
		II–VI	3.80
II–IV–VI			
8870	169.2	II–IV	12.67
		II–VI	3.09
		IV–VI	9.58

COMPRESSIBILITY DIFFERENCE, CM³/KG PER ATM.

I > II, by *ca.* 0.0_38.
I > VI, by *ca.* 0.0_35.
IV > II, by *ca.* 0.0_38.

NH_4NO_3.—(*Continued*)
II > III, by $0.0_{2}13$.
III < IV, by $0.0_{2}38$.

Thermal Expansion Difference
cm³/kg per °C
At 74 atm.

II > III by 0.038°.
IV > III by 0.115°.

The notation V is reserved for a form stable at atmospheric pressure below −20°C.

Cohen and Kooy (14) claim an error of 9 % in the changes of volume listed above for IV–III.

NH_4Cl (13)

P, atm.	t, °C	ΔV, cm³/kg
0	184.3	98.5
100	191.1	109.0
200	198.3	116.4
300	205.7	121.7
	NH_4Br (13)	
1	137.8	64.7
100	146.3	65.2
200	155.1	65.6
300	164.3	65.9
400	173.5	66.0
500	183.5	65.9
600	193.8	65.7
700	204.4	65.4
	NH_4I (13)	
1	−17.6*	56.1
237	0.0	55.4
487	+20.0	54.7
718	40.0	54.0
933	60.0	53.4
1 133	80.0	52.8
1 318	100.0	52.3
1 488	120.0	51.8
1 644	140.0	51.4
1 789	160.0	51.0
1 924	180.0	50.7
2 050	200.0	50.4

Difference of compressibility not greater than 0.001 cm³/kg. Not known which is the greater.

* Extrapolated.

NH_4HSO_4 (13); *see* Fig. 4

	I–II	
1 180	40	13.3
1 330	60	12.9
1 470	80	12.6
1 620	100	12.2
1 750	120	11.9
	I–III	
1 800	130	5.3
1 800	150	
	II–III	
2 000	129.5	6.3
3 000	144.8	5.5
4 000	158.6	5.2
5 000	171.3	5.8

P, atm.	t, °C	ΔV, cm³/kg
	III–IV	
5 470	177.0	1.7
5 350	181.0	2.7
	IV–V	
6 000	179.3	4.5
7 000	184.1	3.9
8 000	188.1	3.5
9 000	191.6	3.2
10 000	194.8	2.9

Highly probable that there is a fifth modification at upper end of II–IV line.

Triple Points
I–II–III: 1800 atm., 126.2°.
II–III–IV: 5480 atm., 176.9°.

SbI_3 (8)

At 200.8°, ΔV = 24.0 cm³/kg. Melting pressure = 1120 atm. (data incomplete).

Sb_2S_3 (13)

The red modification has a reversible transformation running from 7550 atm., 0°, to 11 600 atm., 32°.

ΔV = *ca.* 10 cm³/kg.

CO_2 (7); *cf.* (29, 31)

P, atm.	t, °C	ΔV, cm³/kg
1	−56.6	
1 000	−36.7	
2 000	−19.4	
3 000	− 4.1	106.1
4 000	+10.1	96.7
5 000	23.1	88.3
6 000	35.4	80.8
7 000	46.9	74.1
8 000	57.9	68.3
9 000	68.3	63.3
10 000	78.3	58.9
11 000	87.8	55.2
12 000	97.0	52.0

For other carbon compounds *v.* the C-Table.

SiO_2, *v.* p. 19

$SiCl_4$ (8)

P, atm.	t, °C	ΔV, cm³/kg
2 000	− 8.2	51.8
3 000	+19.3	46.6
4 000	46.1	42.4
5 000	72.2	39.0
6 000	97 3	36.3
7 000	121.8	34.3
8 000	145.5	32.6
9 000	168.6	31.3
10 000	191.2	30.3
11 000	213.3	29.4

$TlNO_3$ (12)

P, atm.	t, °C	ΔV, cm³/kg
	I–II	
1	144.6	2.44
1 000	153.2	2.42
2 000	161.6	2.41
3 000	170.0	2.39
4 000	178.4	2.37
5 000	186.6	2.35
6 000	194.6	2.34
7 000	202.4	2.32
	II–III	
1	75.0	0.730
1 000	81.8	0.700
2 000	88.5	0.675
3 000	95.1	0.645
4 000	101.6	0.620
5 000	108.0	0.595
6 000	114.3	0.565
7 000	120.6	0.545
8 000	126.9	0.510
9 000	133.1	0.485
10 000	139.3	0.460
11 000	145.4	0.435
12 000	151.5	0.410

Compressibility Difference

cm³/kg per atm.
I = II approx.
At 75°, III > II by $0.0_{3}5$.
At 105°, III > II by $0.0_{3}3$.
At 140°, III > II by $0.0_{3}15$.

HgI_2 (11); *cf.* (21); *see* Fig. 5

P, atm.	t, °C	ΔV, cm³/kg
1	127.0	3.4
1 000	150.4	2.1
2 000	166.0	1.2
3 000	175.6	0.6
4 000	180.2	+0.2
5 000	181.2	−0.1
6 000	177.0	−0.5
7 000	166.3	−1.0
8 000	145.7	−1.8
9 000	111.0	−2.9
10 000	62.2	−4.2

I more compressible than II by *ca.* $0.0_{3}4$ cm³/kg per atm.

Cu_2I_2 (13)

$P = 11\,570 - (t - 100) \times 19.70$ atm.

$\Delta V = 5.35 - (t - 100) \times 0.0050$ cm³/kg per atm.

The low temperature modification is less compressible than the high temperature modification by $0.0_{3}4$ cm³/kg per atm.

AgI (11); *cf.* (24, 29, 30)

P, atm.	t, °C	ΔV, cm³/kg
	I–II	
1	144.6	8.6
1000	129.1	9.1
2000	112.4	9.6
3000	94.3	10.2
	I–III	
3000	107.7	13.8
4000	138.0	12.7
5000	169.0	11.0
6000	201.9	8.9
	II–III	
2904	30.0	23.9
2856	50.0	23.9
2804	70.0	24.0
2744	90.0	24.1
2710	100.0	24.1

Triple Point and Volume Change

P, atm.	t, °C	Direction of volume change	ΔV, cm³/kg
2720	99.4	I–II	10.1
		I–III	14.0
		II–III	24.1

$AgNO_3$ (12); *cf.* (17); *see* Fig. 6

P, atm.	t, °C	ΔV, cm³/kg
1	159.4	2.50
1000	151.5	2.54
2000	143.4	2.59
3000	135.0	2.66
4000	126.2	2.73
5000	117.2	2.81
6000	107.7	2.89
7000	95.9	2.99
8000	77.5	3.11
8500	64.0	3.17
9000	42.8	3.24
9460	0.0	3.30

Compressibility Difference

P, atm.	I–II, cm³/kg per atm.
1	$-0.0_{3}45$
2000	$-0.0_{3}34$
4000	$-0.0_{3}24$
6000	$-0.0_{3}14$
8000	0.000
9000	$+0.0_{3}11$
9460	$0.0_{3}16$

$KClO_3$ (11)

$P = 5500 + 10.9t$, atm.

$\Delta V = 25.1 - 0.0022t$, cm³/kg per atm.

Difference of compressibility probably $\ngtr 0.0_{3}2$ cm³/kg per atm.

K_2S (11)

$t = 146.4 + 0.0124P$.

$\Delta V = 0.95 - 0.00003P$ cm³/kg per atm.

Low temperature form is about 0.0_21 more compressible.

$KHSO_4$ (13); *see* Fig. 7

P, atm.	t, °C	ΔV, cm³/kg
I–II		
1	180.5	0.66
1000	190.7	1.39
2000	201.0	2.14
I–IV		
2000	202.6	3.06
3000	220.1	2.88
II–IV		
1750	200.0	1.13
2005	180.0	1.12
2265	160.0	1.11
2525	140.0	1.11
2780	120.0	1.10
II–III		
1	164.2	5.56
1000	147.9	5.61
2000	131.4	5.66
3000	115.0	5.72
III–IV		
3000	114.6	6.8
4000	94.8	6.4
5000	72.2	6.1
6000	46.0	5.7

Triple Points and Volume Changes

P, atm.	t, °C	Direction of volume change	ΔV, cm³/kg
I–II–IV			
1770	198.6	I–II	1.97
		II–IV	1.13
		I–IV	3.10
II–III–IV			
2805	118.2	II–III	5.70
		II–IV	1.10
		III–IV	6.80

Thermal Expansion Difference

At 1 atm. I > II by 0.5 cm³/kg per °C.

At 1 atm. II > III by 0.04 cm³/kg per °C.

III probably > IV.

KNO_2 (11)

P, atm.	t, °C	ΔV, cm³/kg
5 000	− 0.3	31.0
6 000	+17.4	32.4
7 000	35.7	33.8
8 000	56.6	35.1
9 000	83.1	36.5
10 000	122.3	37.8

KNO_3 (12); *cf.* (17); *see* Fig. 8

P, atm.	t, °C	ΔV, cm³/kg
I–III		
1	125.8	14.2
1000	147.8	13.9
2000	169.1	13.7
3000	190.0	13.6
4000	210.6	13.5
I–II		
1	127.7	6.0
II–III		
495	120.0	10.5
1260	100.0	12.9
1840	80.0	14.1
2275	60.0	14.8
2605	40.0	15.3
2860	20.0	15.6
II–IV		
2580	0.0	44.7
2700	10.0	44.4
2825	20.0	41.0
III–IV		
3000	27.7	28.2
4000	66.3	27.3
5000	102.5	26.7
6000	136.3	26.3
7000	167.8	25.7
8000	196.3	25.3
9000	221.5	24.9

Triple Points and Volume Changes

P, atm.	t, °C	Direction of volume change	ΔV, cm³/kg
I–III–IV			
2835	21.3	II–III	15.6
		III–IV	28.4
		II–IV	44.0
I–II–III			
110	128.3	I–III	14.2
		II–III	8.9
		I–II	5.3

Compressibility Difference

III > I, by *ca.* 0.001 cm³/kg per atm.

III > IV, by *ca.* 0.06 cm³/kg per atm.

III probably > II.

Thermal Expansion

III > I, by *ca.* 0.06 cm³/kg per °C.

KCNS (11)

P, atm.	t, °C	ΔV, cm³/kg
L–I		
1	171.2* [173.2]	49.7*
1000	193.3	46.2

* Extrapolated.

P, atm.	t, °C	ΔV, cm³/kg
I–II		
1	140.0	3.06
1000	158.5	2.43
2000	174.9	1.98
3000	190.6	1.68
4000	205.7	1.49

$RbNO_3$* (12)

P, atm.	t, °C	ΔV, cm³/kg
II–III		
1	164.4	6.88
1000	174.4	6.45
2000	184.1	6.00
3000	193.5	5.57
4000	202.6	5.12
5000	211.5	4.69
6000	220.3	4.26

The difference of volume between I and II is probably very small (35).

* Material somewhat impure with acid.

$CsNO_3$ (12)

P, atm.	t, °C	ΔV, cm³/kg
1	153.7	4.05
1000	163.4	3.86
2000	172.9	3.68
3000	182.2	3.50
4000	191.3	3.32
5000	200.1	3.13
6000	208.8	2.94

At 80 atm., thermal expansion of I > II by 0.033 cm³/kg per °C. At 4850 atm., the compressibility of I > II by 0.00031 cm³/kg per atm.

C-Table, the C-arrangement

CBr_4 (11, 34); *see* Fig. 9

I–II

$t = 46.2 + 0.0315P$;

$\Delta V = 20.5 - 0.0026P$ cm³/kg per atm.

I–III

$t = 119.5 + (P - 2175) \times 0.1089$;

$\Delta V = 2.9$ cm³/kg per atm.

II–III

$t = 108.5 + (P - 1930) \times 0.0246$;

$\Delta V = 12.3 - 0.0013P$ cm³/kg per atm.

Triple point, I–II–III, 2110 atm., 112.6°

W. Wahl (34) has determined the melting point at atm. pressure to be 92° and finds this to be raised 1° by 15.5 atm. for a small pressure range. He also has made initial determinations of the transition I–II.

CCl_4 (7); *cf.* (2, 29); *see* Fig. 10

P, atm.	t, °C	ΔV, cm³/kg
L–I		
1	−22.6 [−23.0]	25.8
1 000	+15.3	19.9
2 000	48.9	16.3
3 000	78.9	13.8
4 000	106.0	11.6
5 000	130.8	9.9
6 000	154.2	8.3
7 000	176.2	7.0
8 000	197.4	6.0
9 000	217.6	5.2
I–II		
2 000	− 4.6	24.2
3 000	+15.7	23.3
4 000	35.3	22.4
5 000	54.1	21.3
6 000	72.3	20.2
7 000	90.0	19.0
8 000	107.2	17.9
I–III		
9 000	125.8	22.5
10 000	145 9	22.2
11 000	166.0	21.7
12 000	186.2	21.1
II–III		
6 500	+ 6.7	5.6
7 000	34.3	5.6
7 500	61.9	5.6
8 000	89.5	5.5
8 500	117.1	5.4

Triple Points and Volume Changes

P, atm.	t, °C	Direction of volume change	ΔV, cm³/kg
I–II–III			
8460	115	I–II	17.3
		I–III	22.7
		II–III	5.4

$CHBr_3$, Bromoform (8)

P, atm.	t, °C	ΔV, cm³/kg
1	7.78	39.1
1 000	32.3	35.4
2 000	55.3	32.0
3 000	77.2	28.9
4 000	97.3	26.3
5 000	116.3	23.8
6 000	134.1	21.7
7 000	151.1	19.9
8 000	167.4	18.4
9 000	183.3	17.3
10 000	199.0	16.3
11 000	214.6	15.4

$CHCl_3$, Chloroform (7)

P, atm.	t, °C	ΔV, cm³/kg
1	−61.0	
	[−63.5]	
1 000	−43.4	
2 000	−26.5	
3 000	−10.3	52.6
4 000	+ 5.4	49.2
5 000	20.4	46.0
6 000	34.8	43.2
7 000	48.7	40.6
8 000	62.0	38.3
9 000	75.1	36.3
10 000	87.9	34.5
11 000	100.4	33.0
12 000	112.6	31.6

CH_2I_2, Methylene iodide (29); *see* Fig. 11*

P, atm.	t, °C	
1	5.73	(L–I)
135	8.0	
230	10	(L–II)
710	20	
1200	30	
1750	40	
1995	44	(L–III)
2350	50	
2960	60	
1	−6.5	(I–IV)
175	0	
270	+5	
320	9	
180	8.6	(I–II)
325	9.4	
365	10	(II–IV)
1000	20	
1540	30	
1825	38	
1825	38.0	(II–III)
1930	42.8	
1825	38.0	(III–IV)
2195	44	
2450	48	

Triple Points

P, atm.	t, °C	
180	8.6	(L–I–II)
325	9.4	(I–II–IV)
1930	42.8	(L–II–III)
1825	38.0	(II–III–IV)

* Details of this diagram somewhat uncertain; in particular the reality of tne separate existence of III seems to need verification.

CH_4N_2O, Urea (13); *see* Fig. 12

P, atm.	t, °C	ΔV, cm³/kg
I–III		
4180	0.0	49.6
4640	20.0	49.4
5100	40.0	49.2
5560	60	49.0
6020	80	48.8
6480	100	48.6
I–II		
6521	100.0	48.2
6628	120.0	46.5
6735	140.0	44.2
6843	160.0	41.3

Triple Point and Volume Changes

P, atm.	t, °C	Direction of volume change	ΔV, cm³/kg
I–II–III			
6535	102.3	I–III	48.6
		I–II	48.0
		II–III	0.6

Melts 131.7° at 1 atm., 150° at 3000 atm. ΔV (L–I) = 10 cm³/kg.

Compressibility Difference

I < II by *ca.* 0.004 cm³/kg per atm.

I < III by < 0.004 cm³/kg per atm.

NH_4CNS (11)

P, atm.	t, °C	ΔV, cm³/kg
1	87.7	40.9
1000	55.2	41.4
2000	+26.1	41.9
3000	− 0.5	42.4

Compressibility Difference on Transition Line

cm³/kg per atm.

P, atm.	Δ
1	0.0051
1000	0.0043
2000	0.0035
3000	0.0028

The high temp. phase is the less compressible.

C_2Cl_6, Hexachloroethane (11); *cf.* (29)

P, atm.	t, °C	ΔV, cm³/kg
I–II		
1	71.1	28.0
1000	104.8	25.9
2000	138.5	23 7

P, atm.	t, °C	ΔV, cm³/kg
II–III		
1	42.7	9.7
1000	70.7	8.5
2000	98.0	7.5
3000	123.4	6.7
4000	149.5	6.1
5000	173.2	5.6
6000	195.5	5.2

Difference of Compressibility

Δ = II–III; cm³/kg per atm.

P, atm.	Δ
1	0.0024
2000	0.0020
4000	0.0017
6000	0.0015

$C_2H_3ClO_2$, Chloroacetic acid (7, 18); *cf.* (16, 29)

P, atm.	t, °C*	ΔV, cm³/kg
L–stable solid		
1	62.53	107
	[61.2]	
2 000	90	86
4 000	115	67
6 000	137	51
8 000	158	37
10 000	177	25
L–unstable solid		
1	50.0	
800	65.0	

* Approximate values.

$C_2H_4O_2$, Acetic acid (13); *cf.* (25, 29, 33)

P, atm.	t, °C	ΔV, cm³/kg
L–I		
1	16.68	156.0
500	28.2	132.3
1 000	38.3	113.8
1 500	47.3	99.3
2 000	55.3	87.3
L–II		
2 000	55.2	99.6
3 000	70.9	89.9
4 000	85.2	81.8
5 000	98.4	75.0
6 000	110.5	68.8
7 000	121.8	63.6
8 000	132.3	59.2
9 000	142.1	55.8
10 000	151.1	53.0
11 000	159.5	50.8
I–II		
1 040	0	14.0
1 485	25	13.6
1 930	50	13.1

Triple Point and Volume Changes

P, atm.	t, °C	Direction of volume change	ΔV, cm³/kg
I–II–L			
2033	55.7	L–II	99.2
		L–I	86.2
		I–II	13.0

At 76 atm. L more expansible than I by 0.50 cm³/kg per °C.

C_2H_5NO, Acetamide (13, 18)

P, atm.	t, °C	ΔV, cm³/kg
L–I		
1	81.5	109.8
	[81.0]	
1 000	93.5	84.5
2 000	103.7	65.8
3 000	112.5	52.1
4 000	119.9	41.7
5 000	125.9	33.4
L–II		
4 000	113.1	73.7
5 000	124.7	66.5
6 000	135.0	59.6
7 000	144.6	53.2
8 000	153.3	47.9
9 000	161.4	43.6
10 000	168.9	40.1
11 000	175.9	37.4
I–II		
5 810	20.0	30.2
5 740	40.0	30.5
5 645	60.0	30.9
5 535	80.0	31.5
5 310	100.0	32.1
5 265	120.0	32.8
L–unstable solid		
1	69.4	
1 000	86.6	
2 000	97.4	
3 000	105.0	

Triple Point and Volume Changes

P, atm.	t, °C	Direction of volume change	ΔV, cm³/kg
L–I–II			
5220	127.0	L–I	31.9
		L–II	64.9
		I–II	33.0

Compressibility difference, (II − I) = 0.0027 at 20°, and 0.0011 at 120°, cm³/kg per atm. Relation linear.

C_3H_6O, Acetone ([7, 10])
Under 10 000 atm., freezing temperature = *ca.* 40°.

$C_3H_7NO_2$, Urethane ([11]); *cf.* ([27, 29]); *see* Fig. 13

P, atm.	t, °C	ΔV, cm³/kg
L–I		
1	47.9	59.9
500	53.2	45.8
1 000	57.6	37.1
1 500	61.3	31.3
2 000	64.6	27.3
L–II		
2 500	67.9	29.5
3 000	71.2	22.8
3 500	74.0	19.7
4 000	76.4	18.6
L–III		
4 500	82.1	62.3
5 000	88.5	60.4
6 000	100.2	56.4
7 000	111.1	52.7
8 000	121.7	49.1
9 000	131.8	45.7
10 000	141.5	42.6
11 100	151.1	39.5
12 000	160.3	36.7
I–III		
3 060	0	57.2
3 150	10	57.3
3 240	20	57.4
I–II		
3 170	30	9.3
2 930	40	9.5
2 680	50	9.8
2 440	60	10.0
II–III		
3 360	30	48.0
3 520	40	47.5
3 680	50	47.0
3 830	60	46.4
4 000	70	45.9

Triple Points and Volume Changes

P, atm.	t, °C	Direction of volume change	ΔV, cm³/kg
L–I–II			
2270	66.2	L–I	25.3
		L–II	35.5
		I–II	10.2
L–II–III			
4090	76.8	L–II	18.4
		L–III	64.0
		II–III	45.6
I–II–III			
3290	25.5	I–II	9.2
		II–III	48.2
		I–III	57.4

$C_4H_6O_4$, Dimethyl oxalate ([8]); *cf.* ([29])

P, atm.	t, °C	ΔV, cm³/kg
L–solid		
1	54.24	145.3
1000	76.5	110.8
2000	97.1	95.0
3000	116.5	85.5
4000	134.9	79.0
5000	152.4	73.6
6000	169.1	68.6
7000	185.2	64.0
8000	200.8	59.5

$C_6H_4BrNO_2$, *m*-Bromonitrobenzene ([37])

$C_6H_4ClNO_2$, *m*-Chloronitrobenzene ([37])

C_6H_5Br, Bromobenzene ([8])

P, atm.	t, °C	ΔV, cm³/kg
L–solid		
1	−31.1	
1 000	−11.5	48.4
2 000	+ 6.4	42.5
3 000	22.8	37.8
4 000	37.8	34.0
5 000	51.5	30.9
6 000	64.5	28.3
7 000	76.9	26.2
8 000	88.7	24.4
9 000	100.2	23.0
10 000	111.1	21.8
11 000	121.6	20.9
12 000	131.8	20.2

Difference of Compressibility between Solid and Liquid along Melting Curve (Directly Measured) cm³/kg per atm.

P, atm.	Δ
1	0.04
3 000	.006
6 000	.003
9 000	.001
12 000	.0005

C_6H_5Cl, Chlorobenzene ([8])

P, atm.	t, °C	ΔV, cm³/kg
L–solid		
1	−45.5	
1 000	−27.5	
2 000	−11.0	56.1
3 000	+ 4.3	50.8
4 000	18.5	46.4
5 000	31.8	42.6
6 000	44.2	39.4
7 000	55.9	36.6
8 000	66.9	34.2
9 000	77.5	32.2
10 000	87.9	30.6
11 000	97.8	29.2
12 000	107.4	28.1

$C_6H_5NO_2$, Nitrobenzene ([7]); *cf.* ([29])

P, atm.	t, °C	ΔV, cm³/kg
L–solid		
1	5.6	81.4
1 000	27.9	73.3
2 000	49.5	66.1
3 000	70.3	60.0
4 000	90.2	55.1
5 000	108.4	51.5
6 000	125.7	48.5
7 000	142.2	45.9
8 000	158.2	43.5
9 000	173.9	41.5
10 000	189.1	39.7
11 000	204.2	38.1

$C_6H_5NO_3$, *p*-Nitrophenol ([8])

P, atm.	t, °C	ΔV, cm³/kg
L–solid		
1	112.4	89.1
1000	138.5	73.6
2000	160.9	61.0
3000	181.8	51.2
4000	201.3	43.6

C_6H_6, Benzene ([7]); *cf.* ([16, 28, 29])

P, atm.	t, °C	ΔV, cm³/kg
L–I		
1	5.4	131.7
1 000	33.3	103.5
2 000	58.0	86.3
3 000	79.9	75.0
4 000	99.3	66.8
5 000	117.4	60.5
6 000	134.6	55.5
7 000	150.8	51.3
8 000	166.4	47.5
9 000	181.2	44.0
10 000	195.4	41.0
11 000	209.0	38.4
I–II		
11 860	100	10.5
11 690	120	11.1
11 560	140	11.6
11 480	160	12.1
11 430	180	12.6
11 460	200	13.0

C_6H_6O, Phenol ([11]); *cf.* ([16, 29, 30])

P, atm.	t, °C	ΔV, cm³/kg
L–I		
1	40.9	56.7
1 000	53.8	39.0
2 000	63.9	27.4
I–II		

$P = 1284 + 115t$, atm.
$\Delta V = 59.2 - 0.6t$, cm³/kg

P, atm.	t, °C	ΔV, cm³/kg
L–II		
2 000	63.5	82.6
3 000	84.0	76.1
4 000	102.1	70.7
5 000	118.6	66.2
6 000	133.9	62.3
7 000	148.4	58.8
8 000	162.3	55.7
9 000	175.8	52.9
10 000	188.7	50.4
11 000	201.5	48.1
12 000	214.0	46.0

Triple Point and Volume Changes

P, atm.	t, °C	Direction of volume change	ΔV, cm³/kg
L–I–II			
2015	64.0	L–I	27.0
		L–II	82.5
		I–II	55.5

Compressibility Difference cm³/kg per atm.

At triple point, I > II by 0.005.

At 74 atm., L > I by 0.025.

$C_6H_6O_2$, Resorcinol ([15])

L–I

$t = 110.0° + 0.0145P - 0.0_5110P^2$ (to 3000 atm.)

P, atm.	t, °C	ΔV, cm³/kg
I–II		
1	75	
500	44	
1000	20	
1500	+6	
2000	−2	
2500	−6	

Results at higher pressures in much doubt.

C_6H_7N, Aniline ([7]); *cf.* ([29])

P, atm.	t, °C	ΔV, cm³/kg
L–solid		
1	− 6.4	85.4
1 000	+14.0	78.2
2 000	32.9	72.0
3 000	50.2	68.9
4 000	66.5	62.6
5 000	81.6	58.8
6 000	95.7	55.5
7 000	109.4	52.4
8 000	122.5	49.6
9 000	135.0	46.9
10 000	147.1	44.4
11 000	158.9	42.0
12 000	170.3	39.6

$C_6H_{11}NO_2$, Ethyl aminocrotonate [18]

P, atm.	t, °C, stable	t, °C, unstable
1	34.0	19.9
1000	51.2	37.6
2000	64.4	51.9
3000	75.6	63.5

$C_7H_7NO_3$, Nitroanisole [27.5]

C_7H_8O, *o*-Cresol [7]; *cf.* [29]

P, atm.	t, °C	ΔV, cm³/kg
L–I		
1	30.8	83.8
1 000	48.2	67.1
2 000	62.8	55.0
3 000	75.2	46.3
4 000	86.1	40.0
5 000	95.8	35.0
6 000	104.5	31.2
7 000	112.6	28.2
8 000	120.0	25.9
L–II		
6 000	105.5	55.2
7 000	119.5	51.9
8 000	132.6	49.1
9 000	145.2	46.8
10 000	157.2	44.8
11 000	168.9	43.1
12 000	180.2	41.8

Triple Point and Volume Changes

P, atm.	t, °C	Direction of volume change	ΔV, cm³/kg
L–I–II			
5900	130.2	L–I	31.7
		I–II	23.8
		L–II	55.5

C_7H_9N, *p*-Toluidine [8]; *cf.* [16, 19, 23, 29]

P, atm.	t, °C	ΔV, cm³/kg
L–solid		
1	43.6	141.3
1000	69.8	118.9
2000	92.9	103.1
3000	114.0	92.2
4000	133.8	84.3
5000	153.1	77.9
6000	172.1	72.5
7000	190.8	67.8
8000	209.4	63.7

$C_8H_6O_2$, Phthalide [18]

P, atm.	t, °C	ΔV, cm³/kg
L–solid		
1	73.0	
1000	101	
2000	127	
3000	152	

C_8H_8O, Acetophenone [8]

At 200°, ΔV = 45 cm³/kg.

Melting pressure, 11 200 atm.

$C_{10}H_8$, Naphthalene [8]

Melting pressure at 200°, *ca.* 4000 atm.

$C_{10}H_{12}O$, Anethole [8]

ΔV at 74 atm. = 79.3 cm³/kg.

Melting pressure at 100°, *ca.* 4050 atm.

$C_{10}H_{16}O$, Camphor [13, 16]; *see* Fig. 14

P, atm.	t, °C	ΔV,* cm³/kg
I–II		
1	87.1	1.87
500	118.6	1.87
1 000	148.0	1.87
1 500	175.8	1.87
2 000	202.5	1.87
II–III		
1 610	0	58.5
2 060	10	56.3
2 570	20	54.0
III–IV		
3 000	26.5	37.4
4 000	39.2	34.4
5 000	51.3	31.7
6 000	62.8	29.1
7 000	73.6	26.8
8 000	83.9	24.7
9 000	93.6	22.8
10 000	102.7	21.1
11 000	111.2	19.6
12 000	119.1	18.3
IV–V		
2 790	20	
3 350	60	
3 775	90	
II–V		
2 710	20	
2 864	40	
3 036	60	
3 226	80	
3 434	100	
3 662	120	
II–VI		
3 661	120	6.9
3 880	140	6.1
4 081	160	5.7
4 265	180	5.4
4 435	200	5.2
VI–IV		
4 000	90.1	3.5
5 000	108.8	2.2
6 000	124.2	1.2
7 000	136.5	0.5
V–VI		
3 660	90	
3 660	110	
L–I		
1	177.6	

* ΔV is not always very exact.

Initial rise of melting temperature, 129° for 1000 atm.

III is more compressible than IV; difference 0.005 at 3000 and 0.0017 at 12 000 cm³/kg per atm.

Triple points are not accurately located.

$C_{10}H_{20}O$, Menthol [8]

ΔV at 74 atm. = 61.2 cm³/kg.

$C_{12}H_{11}N$, Diphenylamine [7]; *cf.* [3, 23, 27, 29]

P, atm.	t, °C	ΔV, cm³/kg
L–solid		
1	54.0	95.8
1000	80.3	80.1
2000	104.5	70.3
3000	126.8	63.3
4000	147.4	58.0
5000	166.5	53.4
6000	184.3	49.7
7000	201.0	46.6
8000	216.9	44.1

$C_{13}H_{10}O$, Benzophenone [8]; *cf.* [16, 29]

P, atm.	t, °C	ΔV, cm³/kg
L–solid		
1	47.8	90.4
1000	75.4	77.3
2000	100.5	68.4
3000	123.4	61.8
4000	144.7	56.7
5000	164.5	52.6
6000	183.3	49.2
7000	201.1	46.2
8000	218.2	43.6

$C_{14}H_{14}$, Dibenzyl [19]

P, atm.	t, °C	ΔV, cm³/kg
L–solid		
1	51.3	113
500	68.4	105
1000	83.2	96
1500	97.3	88

DIAGRAMS

The arrows denote the direction in which the volume change on transition is becoming numerically less.

α, β, C_p. The location of these symbols shows the side of the transition line corresponding to the form having the higher value of compressibility, thermal expansion, or specific heat at constant pressure.

The dotted enclosing lines delimit the region of indifference.

LITERATURE

(For a key to the periodicals see end of volume)

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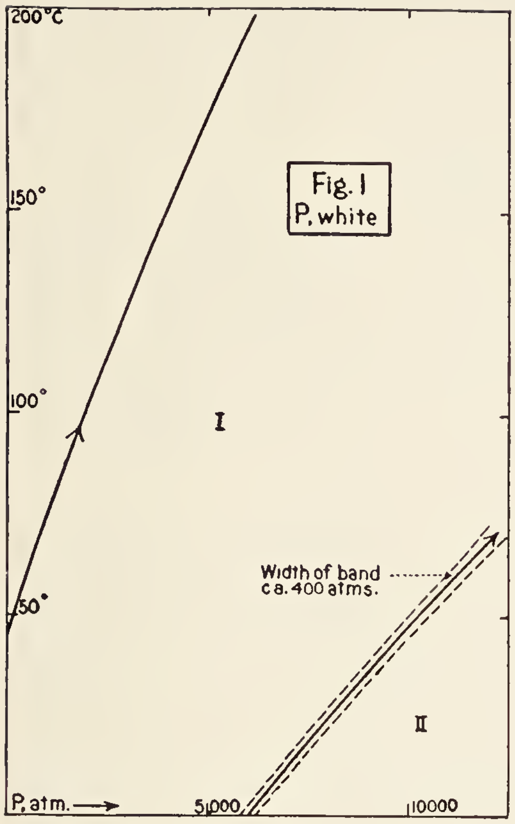
Fig. 1
P. white
200°C
150°
100°
50°
I
II
Width of band
ca. 400 atms.
P, atm.
5,000
10000

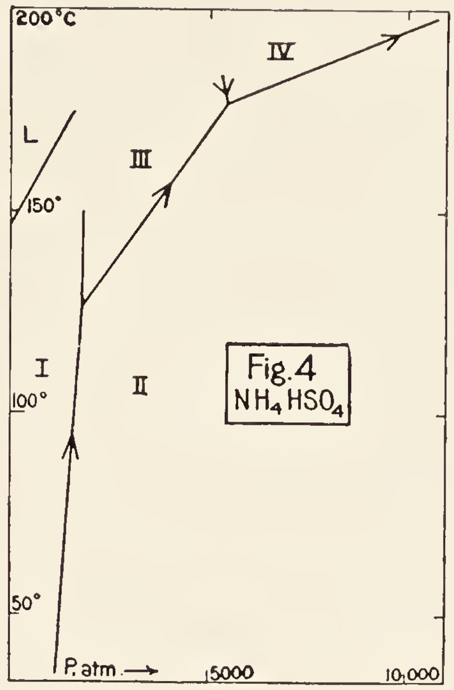
Fig. 4
NH_4HSO_4
200°C
150°
100°
50°
L
I
II
III
IV
P, atm
5000
10,000

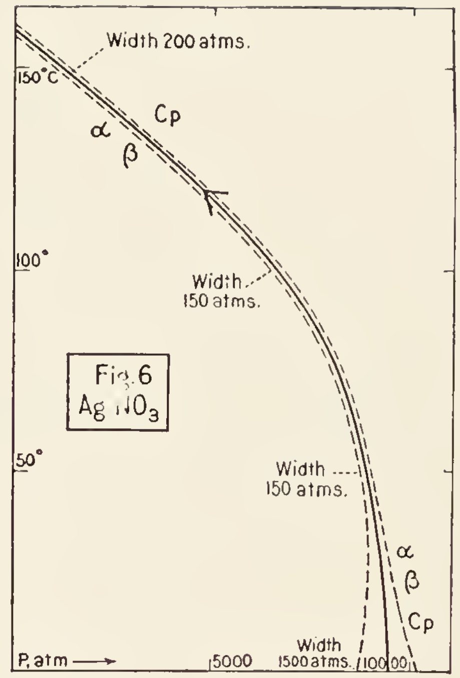
Fig. 6
$AgNO_3$
Width 200 atms.
150°C
100°
50°
Cp
α
β
Width
150 atms.
Width
150 atms.
Width
1500 atms.
P, atm
5000
10000

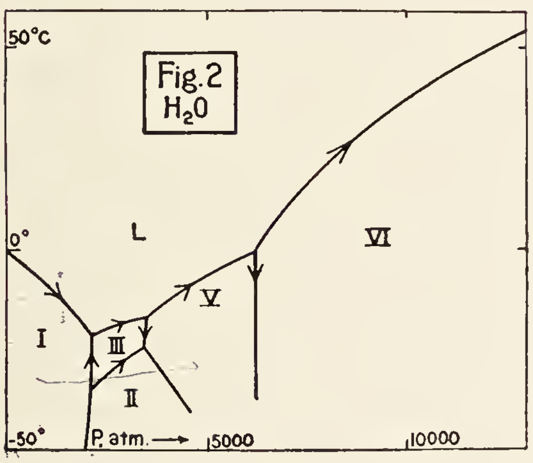
Fig. 2
H_2O
50°C
0°
-50°
L
I
II
III
V
VI
P, atm.
5000
10000

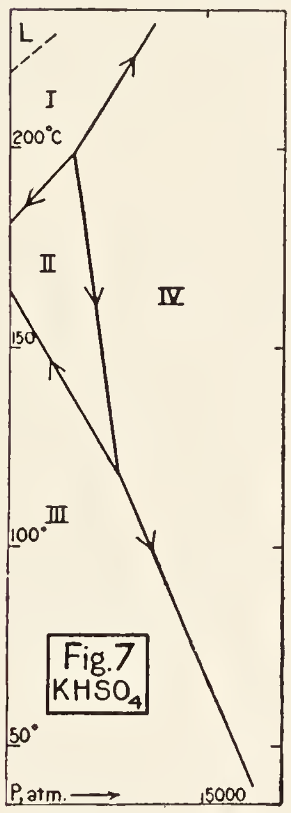
Fig. 7
$KHSO_4$
200°C
150
100°
50°
L
I
II
III
IV
P, atm.
5000

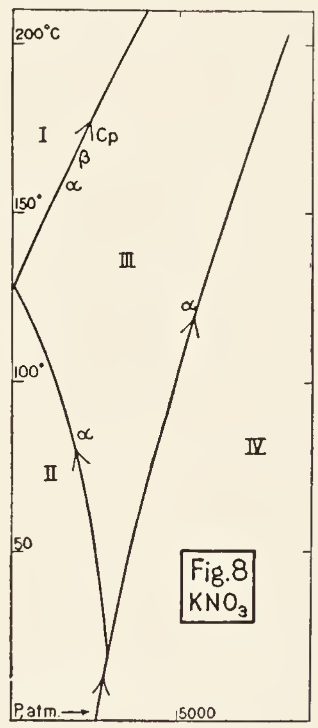
Fig. 8
KNO_3
200°C
150°
100°
50
I
II
III
IV
Cp
β
α
P, atm.
5000

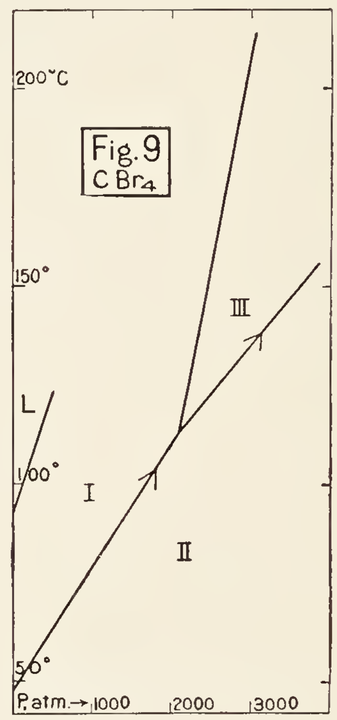
Fig. 9
CBr_4
200°C
150°
100°
50°
L
I
II
III
P, atm.
1000
2000
3000

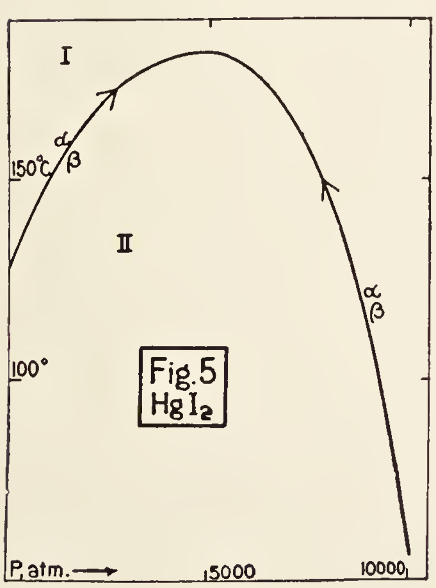
Fig. 5
HgI_2
150°C
100°
I
II
α
β
P, atm.
5000
10000

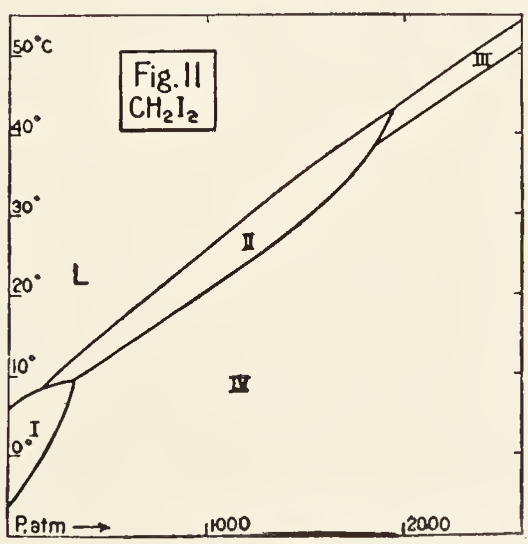
Fig. 11
CH_2I_2
50°C
40°
30°
20°
10°
0°
L
I
II
III
IV
P, atm
1000
2000

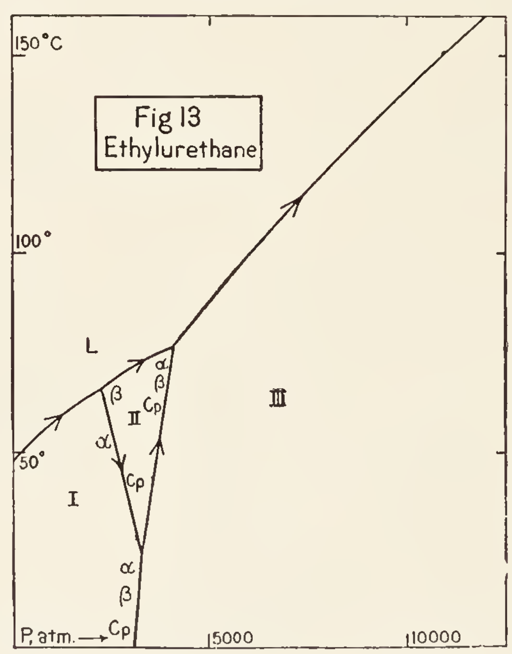
Fig 13
Ethylurethane
150°C
100°
50°
L
I
II
III
α
β
Cp
P, atm.
5000
10000

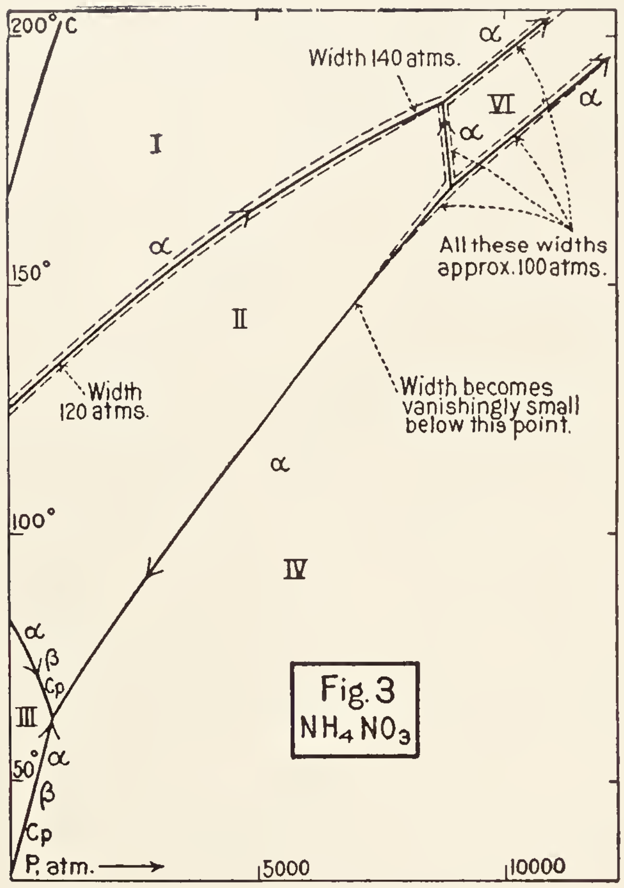
Fig. 3
NH_4NO_3
200° C
150°
100°
50°
P, atm.
5000
10000
Width 140 atms.
All these widths approx. 100 atms.
Width 120 atms.
Width becomes vanishingly small below this point.
I
II
III
IV
VI
α
β
Cp

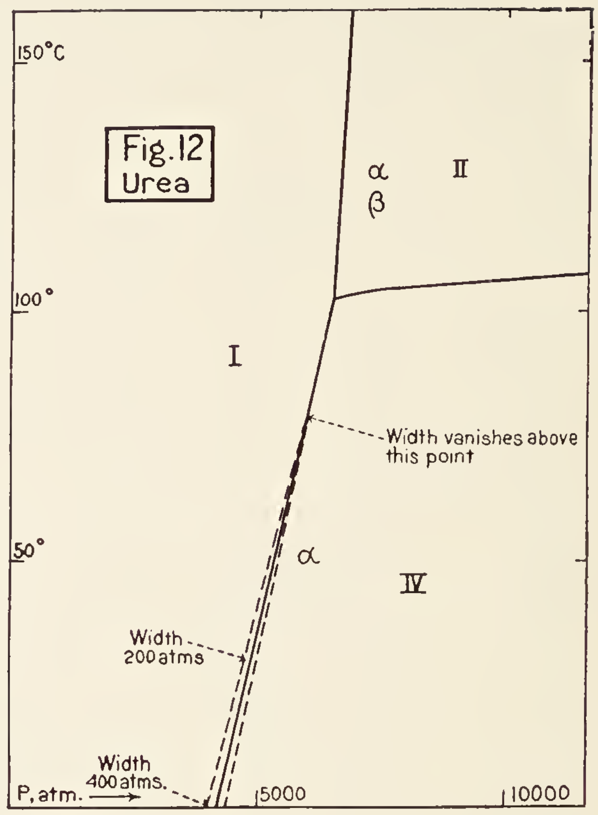
Fig. 12
Urea
150°C
100°
50°
P, atm.
5000
10000
Width vanishes above this point
Width 200 atms
Width 400 atms.
I
II
IV
α
β

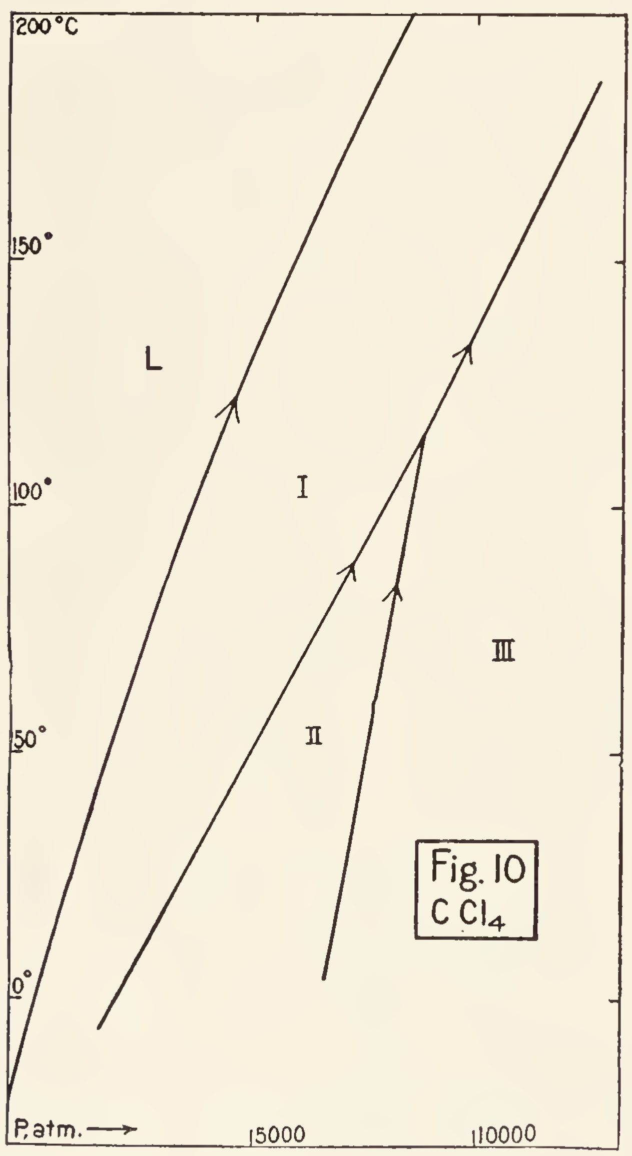
Fig. 10
CCl_4
200°C
150°
100°
50°
0°
P, atm.
5000
10000
L
I
II
III

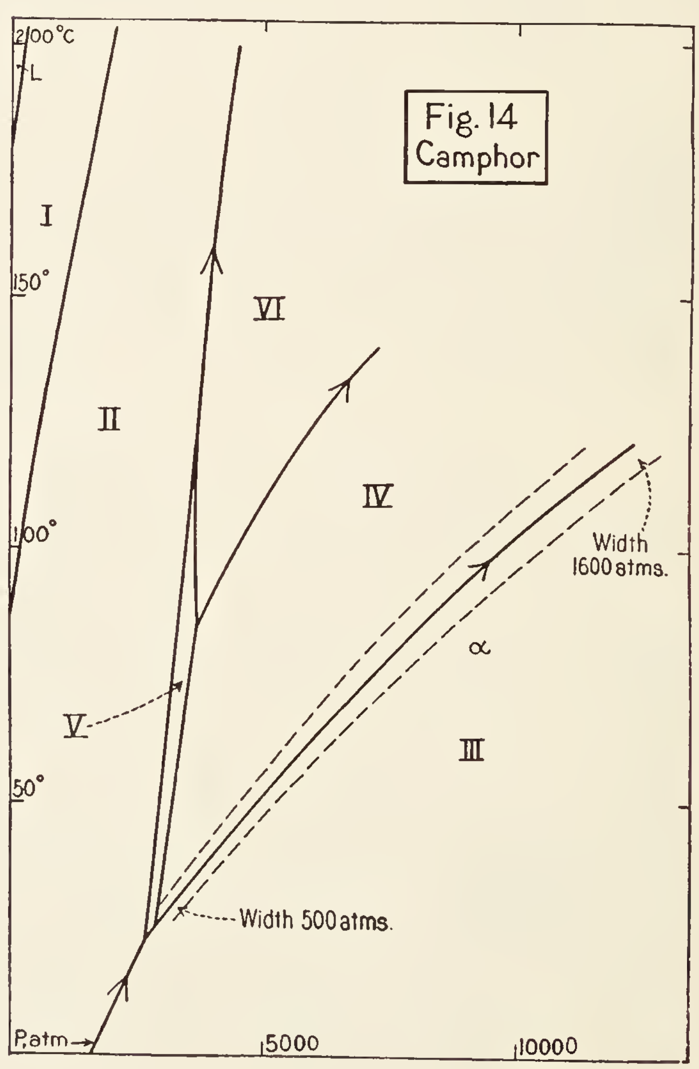
Fig. 14
Camphor
200°C
150°
100°
50°
P, atm
5000
10000
L
I
II
III
IV
V
VI
α
Width 1600 atms.
Width 500 atms.

INTERNAL PRESSURE

J. H. Hildebrand

Internal pressure is the name given to the force of cohesion which, together with the external pressure, balances the thermal pressure. It is indirectly measured by such properties as surface tension, heat of vaporization, expansion and compressibility. It has most frequently been defined by the various equations of state. For example, arranging the familiar van der Waals equation in the form:

$$p + \frac{a}{v^2} = \frac{RT}{v - b},$$

a/v^2 may be called the cohesive pressure and $RT/(v - b)$ the thermal pressure, but since for liquids and solids p is small compared with the other two terms, either of them may be used as a measure of internal pressure, whenever the "constants" a and b are known. Any equation of state which can be put into a corresponding form may be similarly used (*cf.* Sutherland (9)).

Unfortunately little work has been done upon the application of equations of state to ordinary liquids, and the values of internal pressure calculated from them are discordant and of doubtful significance. The pure thermodynamic equation

$$p + \left(\frac{\partial E}{\partial v}\right)_T = T\left(\frac{\partial p}{\partial T}\right)_v$$

is free from these objections, and since $(\partial p/\partial T)_v = \alpha/\beta$, the expansion divided by the compressibility, the internal pressure may be calculated from the expression $T\alpha/\beta$ (Dupré (1)).

If the laws of molecular attraction were definitely known we could calculate $(\partial E/\partial V)_T$ from the heat of vaporization, L, and from the molecular surface energy, E_σ. As it is, we can conclude that internal pressures are roughly proportional to $(L - RT)/v$, and to $E_\sigma/v^{1/3}$, where v is the molal volume of the liquid (*cf.* Dupré, (2) Stefan, (8) and Hildebrand (3)).

Laplace (5) has given expressions connecting the intermolecular attraction, on the one hand, with the force parallel to the surface, *i.e.*, the surface tension, γ, and, on the other hand, with the force normal to the surface, which may be called internal pressure. If an inverse power law of molecular attraction is assumed this makes internal pressure proportional to $\gamma/v^{1/3}$.

Relative internal pressures have been estimated by Mortimer (7) from a consideration of solubility data.

A critical discussion of the methods for calculating internal pressure, together with its relation to solubility, is given in Hildebrand (4, 11); *see also* Lewis (6); Richards (10).

Since the various methods for calculating internal pressure differ greatly as to magnitude but agree rather well as to relative values, a brief illustrative table is given below in which the values for certain liquids (marked*) have been calculated from the relation $T\alpha/\beta$. The values for the others have been estimated from the relative figures obtained by other methods.

Polar liquids have been omitted because the different methods give highly discordant results.

Internal Pressures of Liquids

	Atm.		Atm.
Octane*	2 900	Ethylene bromide*	4 700
Ethyl ether	3 100	Carbon disulfide	5 400
Stannic chloride	3 400	Bromoform*	5 600
m-Xylene*	3 640	Bromine	6 000
Carbon tetrachloride*	3 640	Sulfur monochloride	6 100
Toluene*	3 780	Sulfur	8 000
Chloroform*	3 830	Iodine	8 000
Benzene*	4 050	Phosphorus	9 000
Naphthalene	4 400	Mercury*	13 050
Iodobenzene	4 600		

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(For a key to the periodicals see end of volume)

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MECHANICAL AND THERMAL PROPERTIES OF THE VARIOUS FORMS OF SILICA

Robert B. Sosman

CRYSTALLOGRAPHIC SYMMETRY

Symmetry system	Symmetry class: Schoenflies	Dana	Groth
Low-quartz			
Hexagonal; rhombohedral (or trigonal) subdivision	Trigonal enantiomorphous hemihedral, D_3	Rhombohedral	Trigonal trapezohedral
High-quartz			
Hexagonal; hexagonal subdivision	Hexagonal enantiomorphous hemihedral, D_6	Hexagonal trapezohedral	
Low-tridymite			
Orthorhombic			
Lower high-tridymite			
Hexagonal	(A hemihedral class?)		
Upper high-tridymite			
Hexagonal	(A holohedral class?)		
Low-cristobalite			
Either tetragonal or orthorhombic			
High-cristobalite			
Isometric			

INVERSION POINTS

High-low Inversion Point of Quartz

Property studied	Form of specimen	Inversion point, °C rising temp.	Lit.
Linear therm. expans.	Bars 5 × 5 × 110 mm	*ca.* 570	(37)
Rotatory power	Plate 10 × 10 × 3 mm	*ca.* 570	(38)
Birefringence	Plates	575	(80)
Birefringence	Plates	570	(46)
Refractive index	Crystals	571	(56)
Latent heat	Powder	575	(25, 26)
Latent heat	Plates	573	(5)
Young's modulus	Plates	576	(50)

Inversion Points of Cristobalite

Source	Property studied	°C Rising	°C Falling	Lit.
Natural, Mexico....	Birefringence	175	175	(45)
Agate (?) at 1500°..	Dilatation	210		(39)
Spherulites in glass..	Birefringence	*ca.* 225		(66)
	Latent heat	220 (min)	198 (min)	(25, 26)
	Latent heat	230		(22)
Dinas brick........	Latent heat		226–229	(21)
Dinas brick........			228	(54)
Norway quartz.....	Volume	210–245*	220–200†	(54)
Flint..............	Volume	228–230*	229–226†	(54)
Amorphous SiO_2....	Volume	215–250*	217–208†	(54)
Vein quartz........	Volume		223–205†	(54)
Vitreous SiO_2 at 1500°, 1 hr	Cracking (milkiness)		229	(54)
Basalt, Blaue Kuppe	Not stated	235–250	215–230	(51)
Pptd. SiO_2, 1600°...	Heat capacity	270	230	(78)
Pptd. SiO_2, 1100°...	Heat capacity	230	200	(78)
Chalcedony, 1450°..	Latent heat		220	(77)
Flint, 1450°........	Latent heat		227	(77)
Purif. flint, 1500°...	Latent heat		244	(77)

* Temperature of dilatometer probably higher than specimen.
† Temperature of dilatometer probably lower than specimen.

DENSITY

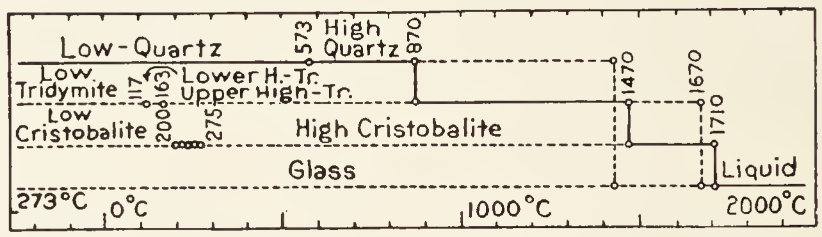
Density at 0°C

Modification	d, g/cm³	±	Lit.
Low-quartz...........	2.6506	0.0005	(32, 43, 47, 48, 69, 70)
Low-tridymite........	2.26	0.01	(15, 25, 26, 77)
Low-cristobalite.......	2.32	0.01	(16, 25, 26, 77)
Vitreous silica........	2.203	0.002	(14, 71, 72)

The Density of Tridymite

It is doubtful whether the density of low-tridymite can be obtained with high accuracy by the method of liquid immersion, since each crystal is finely twinned as a result of the high-low inversions, and minute interspaces may exist which are not accessible to the immersion liquid. Their effect, however, should not exceed a small fraction of one per cent.

Source	°C	d, g/cm³	Lit.
....	27	2.262	(25, 26)
Purified flint and Na_2WO_4 at 1300°	25	2.264	(77)
Quartz in NaCl melt..............	14.1	2.285	(15)
	15.5	2.284	



Ranges of stability and metastability of the modifications of silica (67).

Cristobalite of Normal Density

Source	°C	d, g/cm³	Lit.
....	27	2.325	(25, 26)
Quartz, 3 days at 1200°.............	25	2.320	(16)
Quartz, 6 days at 1160°.............	25	2.319	(16)
Vitreous SiO_2, 3 days at 1200°.......	25	2.310	(16)
Vitreous SiO_2, 6 days at 1160°.......	25	2.311	(16)
Purified flint and Na_2WO_4 at 1500°...	25	2.324	(77)

Density-Temperature Table

The figures in small type have relative significance only

t, °C	Quartz	Tridymite	Cristobalite	Vitreous
−250	2.665			2.203
−200	2.664			2.203
−150	2.662			
−100	2.659			2.203
− 50	2.655			
0	2.651	2.262	2.320	2.203
+ 50	2.646	2.255	2.317	
100	2.641	2.249	2.313	2.203
117		2.247		
		2.242		
150	2.636	2.235	2.305	
163		2.233		
		2.228		
200	2.630	2.221	2.292	2.202
250	2.623	2.214	2.229	
300	2.616	2.209	2.222	2.202
350	2.609			
400	2.601	2.201	2.212	2.202
450	2.591			
500	2.581	2.195	2.208	2.201
550	2.564			

t, °C	Quartz	Tridymite	Cristobalite	Vitreous
573	{2.554, 2.533}			
600	2.533	2.19$_2$	2.20$_3$	2.201
700	2.534	2.18$_9$		2.201
800	2.535	2.18$_9$		2.200
900	2.537	2.18$_9$		2.200
1000	2.541	2.19$_0$		2.200
1100	2.543			2.199
1200	2.546			

THERMAL EXPANSION

$\alpha = \dfrac{10^6}{v}\dfrac{dv}{dt}$ at t°C; $\alpha_m = \dfrac{10^6}{v_o}\dfrac{\Delta v}{t}$ where Δv = expansion in volume between 0° and t°C (6, 10, 13, 14, 17, 18, 19, 20, 31, 34, 36, 37, 39, 41, 42, 49, 52, 53, 57, 58, 59, 60, 61, 62, 68, 79)

t, °C	Quartz		Tridymite		Cristobalite		Vitreous	
	α	α_m	α	α_m	α	α_m	α	α_m
−250		21.3						−1.05
−200	12	24.6					−2.6	−0.6
−150	19	27.35						−0.1
−100	25.2	29.7					−0.9	+0.4
− 50	29.8	31.73						0.75
0	33.6	33.58	73	73	17	17	+1.1	1.15
+ 50	36.8	35.29	61	69	29	21	1.5	1.3
100	40.0	36.91	49	62	56	31	1.7	1.45
117				{60, 77}				
150	43.3	38.50	89	81	81	44	1.7	1.55
163				{81, 94}				
200	46.6	40.07	72	92	180	62	1.7	1.6
250	50.4	41.75	55	87	80	163	1.8	
300	54.9	43.55	45	81	58	147	1.8	1.67
350		45.6						
400	67.4	48.0	31	70	35	121	1.8	1.70
450		50.8						
500	100	54.5	21	62	22	103	1.7	1.70
550	141	61.3						
573		{66.1, 81.2}						
600	0	77.6	+12	54	13	89	1.6	1.68
700		65.8						
800	− 4	57.2	0	42			1.5	1.62
900		49.4						
1000	−12	43.4	− 7	33			1.9	1.62
1100		38.3						
1200		34.1						

VOLUME CHANGE ON INVERSION

Inversion	t_{Tr}, °C	Volume increase		Lit.
		cm³/kg	% of v_o	
Low- to high-quartz....	573	3.25	0.86	(10, 17, 36, 38)
Low- to lower high-tridymite...........	117	0.63	0.14	(10, 77)
Lower high- to upper high-tridymite.......	163	*ca.* 1	*ca.* 0.2	(10, 77)
Low- to high-cristobalite..............	200 to 275	12	2.8	(10, 77)

THERMAL CONDUCTIVITY (23, 24, 29, 74); *cf.* (81)

Unit, cal$_{20}$ cm^{-2} sec^{-1} (°C cm^{-1})^{1}

t, °C	10^3K			t, °C	10^3K		
	Quartz ∥ to axis	Quartz ⊥ to axis	Vitreous silica		Quartz ∥ to axis	Quartz ⊥ to axis	Vitreous silica
−252		680		−100	52	26	2.5
−250		510	*ca.* 1.3	− 50	40	20.5	3.0
−240		205		0	32	17.0	3.4
−200	*ca.* 150	66	1.5	+ 50	25.5	14.9	3.8
−150	74	36	2.0	100	21	13.1	*ca.* 4.5

ELASTIC PROPERTIES

Elastic Constants of Vitreous Silica at Room Temperature

The unit is the kilomegabarye (= 10^9 dyne/cm²). These are not theoretically consistent, but represent independent estimates from available data for each constant.

Constant	Values		Lit.
	Best	Range	
Modulus of compression...	37$_0$	317–474	(11, 33, 44, 63, 65)
Rigidity..................	30$_5$	146–308	(3, 9, 30, 33, 35, 63, 65, 72, 73)
Young's modulus..........	70$_0$	400–711	(9, 33, 40, 65, 72)
Modulus of penetration....	69$_0$		(2)
Poisson's ratio............	0.14	0.13–0.31	(9, 33, 63, 65, 72)

"Principal Elastic Constants" of Low-quartz at Room Temperature

Unit of stress is the kilomegabarye (= 10^9 dyne/cm²) (50, 75)

Principal elastic coefficients	Principal elastic moduli
s_{11} 1298 × 10^{-6}	c_{11} 851
s_{33} 990 × 10^{-6}	c_{33} 1053
s_{44} 2005 × 10^{-6}	c_{44} 571
s_{12} − 166 × 10^{-6}	c_{12} 69
s_{13} − 152 × 10^{-6}	c_{13} 140
s_{14} − 431 × 10^{-6}	c_{14} 168

Elastic Constants of Low-quartz at Room Temperature, Derived from the Above Data

Unit of stress is the kilomegabarye (= 10^9 dyne/cm²)

Volume compressibility........................	2646 × 10^{-6}
Linear compressibility parallel to axis............	686 × 10^{-6}
Linear compressibility perpendicular to axis......	980 × 10^{-6}
Young's modulus parallel to axis................	1010
Young's modulus perpendicular to axis..........	770

Mean Coefficient of Compressibility of Forms of Silica, at about 20°C

$\beta_m = \dfrac{1}{v_o}\cdot\dfrac{v_o - v}{p}$; volume at pressure p = volume at zero pressure × $(1 - \beta_m p)$ (1, 4, 11, 12, 44, 63)

p (megabarye).....		0	2 000	4 000	6 000	8 000	10 000	12 000
$10^6\beta_m$	Quartz.....	2.76	2.71	2.65	2.59	2.54	2.49	2.44
	Vitreous...	2.68	2.72	2.76	2.80	2.84	2.88	2.92

STRENGTH

Strength of Quartz and of Vitreous Silica at Room Temperature

Unit of stress is the kilomegabarye (= 10^9 dyne/cm²) (7, 8, 55, 64, 76)

	Quartz		Vitreous silica
	∥ to axis	⊥ to axis	
Crushing strength			
Typical for small specimens..	24	22	19.5
Maximum observed.........	27.2	26.85	22.6

	Quartz ‖ to axis	Quartz ⊥ to axis	Vitreous silica
Tensile strength			
Typical for carefully centered small specimens	1.1	0.83	3 to 8
Maximum observed	1.19	0.91	11.5
Modulus of rupture (bending strength)			
Typical	1.35	0.90	
Maximum observed	1.76	1.30	0.675

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FREEZING-POINT—SOLUBILITY DATA: SYSTEMS CONTAINING A NON-METALLIC ELEMENT AS ONE COMPONENT[1]

C. Tourneux

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Matières

Inhaltsverzeichnis

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Precision in $t°$ or Mol % is indicated as the greatest deviation of an observed value from either a tabular value or the value given on a curve drawn through the plotted original data.

La précision en $t°$ ou en % Mol est indiquée comme étant le plus grand écart entre une valeur observée et la valeur tabulaire ou la valeur donnée sur une courbe de sentiment tracée à partir des données originales.

Die Präzision in $t°$ oder Mol % ist durch die grösste Abweichung eines experimentell bestimmten Wertes gekennzeichnet, die sich entweder aus den Werten der Tabelle oder aus denen der Kurve ergibt, die durch die Original-Werte gelegt worden ist.

Il grado di precisione delle $t°$ e dei Mol % è rappresentato dalla massima deviazione di un valore osservato o dal valore della tabella o dal valore dato da una curva tracciata con i dati originari.

[1] Except: (a) Freezing-point lowerings of aqueous solutions, for which *v.* p. 254, and (b) some two-component systems containing iron as one component, for which *v.* Vol. II, p. 449.

TWO-COMPONENT SYSTEMS

Sec. 1. Both A- and B-components are Elementary Substances

Standard arrangement (*v.* Vol. III, p. viii)

O

B = V (153)

°C	M % A
B	
1715	0
B_2A_3(?)	
1734	7.3
1828	36.0
1935	51.0
2000	58.5

Cl

B = Br (95)

°C ±2	M % A ±4 Mix.	Liq.
− **7.3***	**0**	
− 11.0	2	5
− 14.5	4	10
− 22.5	9	20
− 31.5	16	30
− 42.0	25	40
− 54.0	34	50
− 62.5	43	60
− 71.5	52	70
− 80.0	63	80
− 90.0	76	90
− 98.0	86	95
−102.0	**100**	

* ±0.2.

B = I (159, 160)

°C ±1	M % A
B	
114.5	0
99.5	10
77.0	20
45.0	30
4m	41
B + BA(α)	
8E	40
B + BA(β)	
1mE	42
BA(α)	
18.5	45.0
27.5	**50.0**
BA(β)	
6m	45
14m	50.0
BA(α) + BA_3	
22E	54.4
BA(β) + BA_3	
12mE	**52.5**
BA_3	
20.5m	54
55.0	60.0
83.0	65.0
95.0	70.0
101.0	**75.0**
96.0	90.0
+ 30.0	99.9
BA_3 + A	
−102E	(?)
A	
−101.5	**100**

B = S (10, 150)

°C ±1	M % B
A	
−102	**0**
A_xB	
− 38	8.2
$A_xB + A_4B$	
− 39E	9.86
A_4B	
− 32	15.0
− **30.5**	**20.0**
− 35.5	25.0
− 66.5	35.0
$A_4B + A_2B_2$	
−101.5E	42.5
A_2B_2	
− 85.0	48.0
− **80.0**	**50.0**
A_2B_2 + B	
− 83.0E	52.0
B(rh)*	
− 5.0	55.0
+ 37.5	65
60.0	75
76.0	85
B(rh) + B(mon)	
95.6U	95
B(mon)	
118.8	**100**

*rh = Rhombic; mon = Monoclinic.

B = Te (46)

°C ±2	M % B ±0.5	
BA_4		
223	**20.0**	
Mix_1		
213	20.6	22.5
204.5	21.2	27.5
$Mix_1 + Mix_2$		
202.5E	21.4	30.0
	39.5	30.0
Mix_2		
218	43.2	35.0
233 ↓	46.7	40.0
Mix_2 + B		
238.5U	48.0	41.5
B		
252.5	50.0	
275.5	60.0	
294.0	65.0	
332	70.0	
388	80.0	
426	90.0	
453	**100.0**	

$TeCl_4$ is very slightly soluble in liq. Cl_2.

B = Bi (50)

°C ±2	M % B
A_4B	
206	14.2
226	**20.0**
221	20.8

B = Bi.—(*Continued*)

°C ±2	M % B
$A_4B + A_3B$	
206E	21.5
A_3B	
220	22.4
232	**25.0**
225	26.5
A_3B + AB	
209E	27.5
AB	
280	30.0
318*	38.0
318*	85.5
303	89.5
283	93
AB + B	
267.5E	94.5
B	
271.5	**100**

* Two liq. layers with the following compositions:

t_s	M % B	
328	34	
332		83.8
334	32	
340		82.5

Br

B = I (161)

°C	M % B ±1.0	
A		
− **7.3**	**0**	
Mix_1		
− 6.1	10	5
− 2.8	18	10
+ 2.5	(24)	15
13.8	(33)	25
31.0	43	40
AB		
41.0	**50.0**	
Mix_2		
46.0	58	55
52	(66)	60
83.7	85	80
99.0	93	90
B		
110.6	**100**	
Mix.		
19	32.5	
36	47.1	
40.4	50	
49	60.4	
100	92.9	

B = S (154)

°C ±1	M % B
A	
− **7.3**	**0**
−10.0	10.0
−16.0	20.0
−23.0	25.0
−38.5	30.0
−47.5	35.0
$A_2 + A_2B_2$	
−52.0E	38.5

B = S.—(*Continued*)

°C ±1	M % B
A_2B_2	
−50.5	40.0
−45.5	45.0
−39.5	**50.0**

B = Te (46)

°C ±1	M % B	
A_4B		
363	**20.0**	
Mix_1		
322	22.4	25.0
290	24.2	30.0
264	25.9	35.0
223	27.2	45.0
$Mix_1 + Mix_2$		
200E	29.5	52.5
	61.0	52.5
Mix_2		
211	62.7	55.0
Mix_2 + B		
225U	64.5	60.1
B		
247	65.0	
290	70.0	
335	75.0	
394	85.0	
436	95.0	
453	**100.0**	

$TeBr_4$ is very slightly soluble in Br_2.

B = Bi (50)

°C ±2	M % B
A_3B	
218	**25.0**
214.5	27.0
A_3B + AB	
205E	29.2
AB	
242	31.5
267	35.0
285*	38.0
285*	80.5
273	89.3
AB + B	
261E	94.6
B	
266.5	97.0
271.5	**100**

* Two liq. layers of following compositions:

t_s	M % B	
297	39.8	
299		84.5
306	41.1	
311		87.7

I

B = S (28, 51, 120, 157)

°C ±1	M % B
A	
114.0	**0**
111.2	10.0
108.0	20.0
104.7	30.6
101.5	40.0

I.—(*Continued*)

B = S.—(*Continued*)

°C ±1	M % B
A	
96.0	50.0
89.4	60.0
79.5	70.0
A + B*	
65.7E	80.5
B*	
71.5	85.0
81.5	90.0
96.0	95.0
119.0	**100.0**

* Monoclinic.

B = Se (17, 137)

°C ±2	M % B
A	
113	**0**
100	10
89	20
80	30
70	40
A + B	
58E	50
B	
93	60
124.5	70
157	80
190	90
218.5	**100**

B = Te (46)

°C ±1	M % B	
A		
114.2	**0**	
A + A_4B		
113.5E	0.5	
A_4B		
280	**20.0**	
235	30.0	
188	37.5	
A_4B + Mix.		
176.3E	45.0	41.0
Mix.		
177.5	45.5	42.0
182	47.0	45.0
Mix. + B		
183.5U	47.5	45.3
B		
191	50.0	
203	54.0	
235	57.5	
256	60.0	
279	65.0	
298	70.0	
355	77.5	
453	**100.0**	

B = As (48, 142, 143)

°C*	M % B
A	
113.5	**0**
103.5	5.0
88.5	10.0
A + A_3B	
72.0E	14.0

B = As.—(*Continued*)

°C*	M % B
A_3B	
106	20.0
121	22.5
140.5	**25.0**
129	27.5
A_3B + A_4B_2	
121.5E	28.5
A_4B_2	
131	30.0
135†	30.1
135†	70.0
128	78.0
A_4B_2 + B	
119E	81.0
B	
(500)	100

* ±1 (0–14 M % B); ±4 (14–81 M % B).
† Two liq. layers.

B = Sb (48, 142)

°C*	M % B
A	
114	**0**
103.0	5.0
88.0	10.0
A + BA_3	
80.0E	11.7
BA_3	
96.0	15.0
132	20.0
171	**25.0**
169†	25–30
169†	71.6
168.2	80.0
167.5	90.0
BA_3 + B	
(?)E	(?)
B	
632	**100**

* ±0.5 (0–12 M % B); ±2 (12–25 M % B); ±1 (25–90 M % B).
† Two liq. layers.

B = Bi (98, 110)

°C ±5	M % B
A	
113.5	**0**
A + A_3B	
113E	6
A_3B	
300	7
400	20.0
410	**25.0**
385	30.0
340*	39.0
340*	96.5
A_3B + AB	
281U	98.0
AB + B	
270E	99.0
B	
272	**100**

* Two liq. layers.

B = Sn (98, 145, 146, 169)

°C ±1	M % B
A	
113.2	**0**
103.0	5.0
87.5	10.0
A + BA_4	
79.0E	12.0
BA_4	
89.8	14.0
108.5	16.0
127	18.0
BA_4 + BA_2	
143U	**20.0**

B = In (162)

°C ±2	M % A
BA	
350	**50**
340	55
304	60
224	65
BA + BA_2	
204E	65.8
BA_2	
207	66.0
211	66.4
212	**66.7**
196	68.0
174	69.0
BA_2 + BA_3	
142E	70.0
BA_3	
162	72.0
190	74.0
200	**75.0**

t_S not detd., mixed crystals possible.

S

B = Se (112)

°C ±2	M % B	
Mix_1		
107 (?)	**0**	
110	5	
110	10	
107.5	15	
Mix_1 + Mix_2		
98E	12	20
	26	20
Mix_2		
105	45	25
108	51	30
110	54	35
111	56	45
114	60	55
Mix_2 + Mix_3		
116U	62	57
	64	57
Mix_3		
117	67	60
122	73	70
135	82	80
160	91	90
207	**100**	

B = Se.—(*Continued*)

°C ±5	M % B (148)	
Mix_1		
119	**0**	
118	2.5	10
115	9	20
109	20	30
Mix_1 + Mix_2		
100E	33	40
	46	40
Mix_2		
125	58	50
142	69	60
155	79	70
Mix_2 + Mix_3		
160U	83	74
	87	74
Mix_3		
182	91	80
202	96	90
217.6	**100**	

B = Te (34, 91)

°C*	M % B	
A		
114	**0**	
Mix_1 + Mix_2		
108E†	1	2
	92	2
Mix_2		
198		5
258	94	10
318		20
347		30
369		40
384	96	50
396		60
408		70
420	97	80
434		90
440	98.5	95
453	**100**	

* ±20 from 2–40 M % B; ±5 from 40–100 M % B. † ±2.

B = P (70); *v.* Fig. 1

°C ±1	M % A
B	
44	**0**
32	5
19	10
+ 6	15
−18m	25
−31m	30
B + AB_2(?)	
− 6E	20
AB_2(?)	
+11	25
25	30
AB_2(?) + A_3B_4	
40U	35
B + A_3B_4	
−38mE	33
A_3B_4	
+98	37.5
143	40
167	**42.8**

B = P.—(*Continued*)

°C ±1	M % A	
A_3B_4		
154	45	
105	47.5	
$A_3B_4 + A_3B_2$		
46E	49.5	
A_3B_2		
210	55	
280	57.5	
296	**60**	
290	62.5	
$A_3B_2 + A_5B_2$		
230E	66.8	
A_5B_2		
266	70	
272	**71.4**	
268	73	
$A_5B_2 + A_6B$		
243E	74.5	
A_6B		
295	80	
312	82.5	
314	**85.6**	
309	90	
250	95	
A		
115	**100**	
°C ±1	M % A (27, 29)	
Mix_1		
44	**0**	
37m ↓	1	5
+15m ↓	4.5	20
0m	7	30
−15m	9.5	40
$Mix_1 + Mix_2$		
10mE	10	23
	78.5	23
Mix_2		
23m	81	30
38m	84	40
52m	87	50
65m	90	60
78m	92.5	70
90m	95	80
102m	97.5	90
115	**100**	

B = As (94)

B = Sb (75, 90, 132)

°C ±3	M % A
B	
632	**0**
619	5.0
615*†§	6.5
615*†§	55.0
$B + B_2A_3$	
520E‡§	57.5
B_2A_3	
537	59.0
546	**60.0**
543	61.0
530	63.8

* Two liq. layers. ‡ 503° (75).
† 593° (75). § ±1.

B = Bi (9, 132)

°C ±5	M % A
B	
277	**0**
$B + A_3B_2$(?)	
270E*	0.75
A_3B_2(?)	
330	1
460	5
525	15
606	30
655	40
730	50
760	52.4

* ±2.

B = Sn (20, 132)

°C ±3	M % A
B	
232	**0**
B + BA	
(?)*	(?)
BA	
853	11
855.5	20
857	30
858	40
860.5	44
869	48
880	**50**
836	53

* 230 to 241°.

B = Pb (62, 76)

°C ±10	M % A
B	
327	**0**
B + AB	
327E*	(?)
AB	
808	4
915	10
972	15
1010	20
1038	30
1045	40
1064	45
1103	**50**

* 325 to 329°.

B = Tl (132)

°C	M % A
B	
302	**0**
B_2A+ (?)	
448*	0–33.3
(?)	
300	47
B_2A_5	
127	**71.4**
127*	71–100
A	
114	**100**

* Two liq. layers.

B = Zn (60)

No values obtainable due to vaporization of one or more of the components.

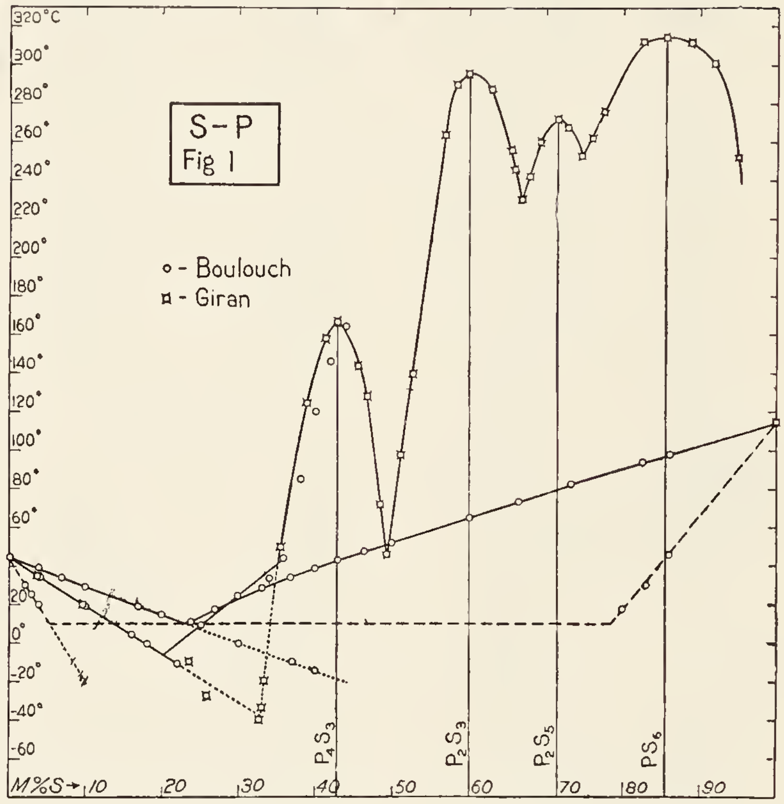
B = Cu (81, 167); *cf.* (65)

°C ±2 (81)	°C ±2 (167)	M % A
B		
1084	**1085**	**0**
1078.5	1073.5	1
$B + AB_2$		
1070E	1067E	2
AB_2		
1121*	1102*	3.6
1121*	1102*	31.0
1134	1111	32.0
1149	1123	33.0
1153	**1127**	**33.3**
AB_2		
1138		35.0
1119		35.7

* Two liq. layers, of the following composition:

°C	M % A U	M % A L
1150	32.3	2.06
1200	32.0	3.41
1300	31.3	3.51
1425	31.1	7.08
1485	31.3	9.55

U = upper layer. L = lower layer



B = Ag (23, 63, 89, 167)

°C ±5	M % A
B	
961	**0**
956	1.0
948	2.0
930	4.0
903*	6.0†
902*	31.6
889	32.0
$B + AB_2$	
865E	32.5
AB_2	
814	**32.9**

* Two liq. layers.
† ±0.5 %; ±3°.

B = Au or Pt (60)

No values obtainable due to vaporization of one or more of the components.

B = Co (59)

°C ±5	M % A
B(?)*	
1494	**0**

B = Co.—(*Continued*)

°C ±5	M % A	
B(?)*		
1467	2	
1428	6	
1400	10	
1370	15	
1339	20	
1246	30	
1115	35	
B* + Mix.		
876E	41.3	40.2
Mix.		
900		41
920		42
Mix. + AB(?)		
936U		43.2
AB(?)		
968		44.0
1044		46.0
1125		48.0

Solid state transformations are also given.

* Or "Mix" with <1.8 M % A.

S.—(*Continued*)

B = Ni [24, 25]

°C ±2	M % A	
B*		
1451	**0**	
1400	5	
1340	10	
1272	15	
1196	20	
1105	25	
918	30	
765	32.5	
B + Mix.		
644E	37.3	34.2
Mix_1		
719	37.8	36.0
772	39.0	38 0
A_3B_2		
787	**40.0**	
Mix_2		
794	41.6	40.5
798	44.1	40.9
805	44.5	41.5
810	44.6	42.8
$Mix_2 + A_6B_6$(?)		
810U	44.6	44.2
A_6B_6(?)		
822	44.5	
848	45.2	

Solid state transformations are also given.

* Or "Mix." with <1 M % A.

B = Na [61]

°C*	M % A†
A_2B_4	
920	**33.3**
898	34.0
826	36.0
732	38.0
$A_2B_4 + A_3B_4$	
665E‡	39.3
A_3B_4	
720	40.0
755	41.0
770	42.0
772	**42.9**
752	44.0
690	46.0
575	48.0
470	49.0
$A_3B_4 + A_4B_4$	
440E‡	49.2
A_4B_4	
445	**50.0**
415	51.0
315	51.5
$A_4B_4 + A_5B_4$	
250E‡	51.8
A_5B_4	
264	52.0
308	53.0
330	54.6
342	55.0
345	**55.5**
338	56.0
308	57.0

B = Na.—(*Continued*)

°C*	M % A†
$A_5B_4 + A_6B_4$	
270E	57.7
A_6B_4	
280	58.0
315	59.0
320	**60.0**
290	61.0
260	61.5
$A_6B_4 + A_7B_4$	
220E	61.8
A_7B_4	
245	62.0
285	63.0
295	**63.6**
265	64.5
232	65.0
$A_7B_4 + A_8B_4$	
198E	65.3
A_8B_4	
225	65.6
240	66.0
255	**66.6**
250	67.0
232	67.5
200	68.0
$A_8B_4 + A_9B_4$	
168E‡	68.3
A_9B_4	
200	68.7
210	**69.2**
203	69.6
185	70.0
$A_9B_4 + A_{10}B_4$	
155E‡	70.6
$A_{10}B_4$	
180	71.0
185	**71.4**

* °C ±5 at <400°; ±10 at >400°.
† ±0.1 M %.
‡ °C ±1 at <400°; ±2 at >400°.

B = Rb [22]

°C ±2	M % A
AB	
420	**50.0**
380	53.0
235	56.0
215	58.0
212*	58.4
212*	60.0
$AB + A_3B_2$	
200U	60.4
A_3B_2	
185	62.0
166	64.0
$A_3B_2 + A_4B_2$	
148.5E	65.75
A_4B_2	
153	66.0
158	66.5
$A_4B_2 + A_5B_2$	
159.5U	66.8
A_5B_2	
198	68.0
220	69.0

B = Rb.—(*Continued*)

°C ±2	M % A
A_5B_2	
229	70.0
231	**71.4**
222	73.0
204	75.0
$A_5B_2 + A_6B_2$	
190U	75.6
A_6B_2	
185†	76.1
185†	77.3

The composition of the solid phases may not be exact, as mixed crystals may exist.

* Two liq. phases (?).
† Two liq. phases.

B = Cs [22]

°C ±2	M % A
A_2B_2	
460	**50.0**
410	50.2
398	51.7
341	54.0
$A_3B_2 + A_4B_2$	
151E	64.0
A_4B_2	
156.5	65.0
159.5	66.0
160	**66.7**
$A_4B_2 + A_5B_2$	
159.5E	66.8
A_5B_2	
183	67.5
204	69.0
209	**71.4**
200.5	72.5
189.5	73 5
$A_5B_2 + A_6B_2$	
178E	74.0
A_6B_2	
184	74.5
186	**75.0**
183.5	75.5
175	76.0
172.8*	76.1
172.8*	77.7

The composition of the solid phases may not be exact, as mixed crystals may exist.

* Two liq. phases(?). From 55.2–57.6 M % A, t_s = 205.5.

Se

B = Te

°C ±2	M % A ±1	
Mix. [96]		
441	**0**	
427	1.2	10
408	4	20
386	7.2	30
358	13.8	40
333	20.5	50
306	30.5	60
275	44.2	70
240	60.0	80
220	68.2	85

B = Te.—(*Continued*)

°C ±2	M % A ±1	
Mix. [96]		
194	79.0	90
156	91.0	95
130	96.8	96.8
184	98	99
197	**100**	
Mix. [141]		
450	**0**	
442	10	
423	20	
399	30	
373	40	
346	50	
317	56.5	60
288	67	70
260	76	80
237	84	90
226	89	95
218	**100**	

B = Sb [2, 37, 42, 43, 129, 132]

See Figs. 2 and 3.

Data of [2, 42, 43, 129] do not agree with the others.

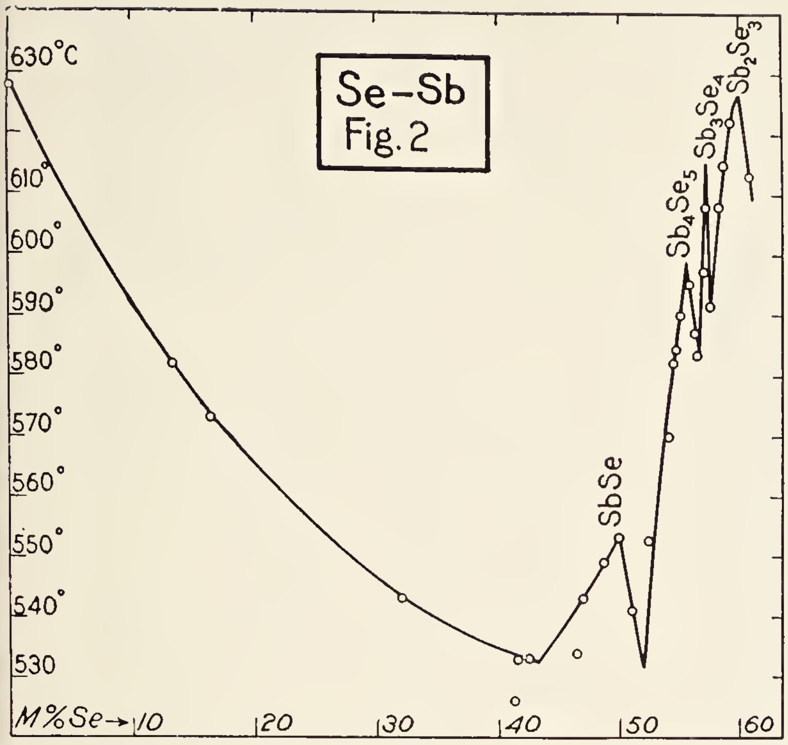
B = Bi [129, 164]

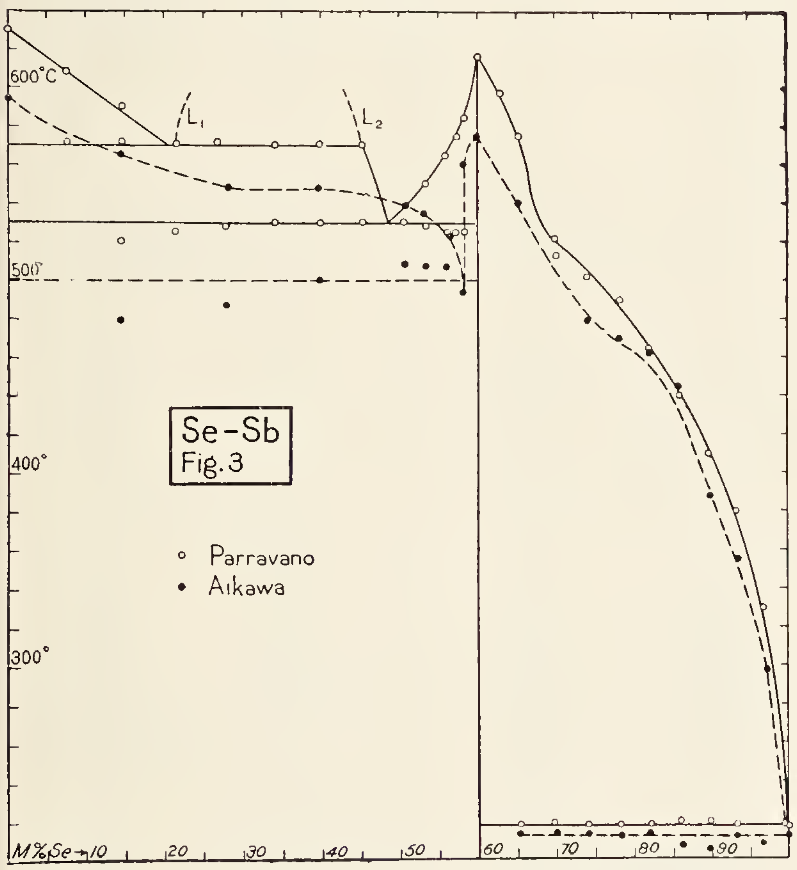
°C ±4 (129)	°C ±5 (164)	M % A
B		
269	**267**	**0**
B + AB(α)		
269E	267E	(?)
AB(α)		
398	396	10
AB(α) + AB(β)		
414*	422U	12
AB(β)		
467	471	20
521	521	30
568	563	40
AB(β) + A_3B_2		
605U	602U	49
A_3B_2		
612	600	50
666	650	55
697	682	58
708	688	60
682	676	65
640	638	70
618	608	72†
618	608	96†
	546	98
	460	99
A_3B_2 + A		
	161E	(?)
A		
217	**217**	**100**

* Only one form observed.
† Two liq. layers.

B = Sn [20, 132]

°C ±10	M % A
B	
232	**0**
B + BA	
232E	(?)





B = Sn.—(*Continued*)

°C ±10	M % A
BA	
688	5
784	10
816	15
822	35
861	**50**
810	52.5
750	55
672	60
BA + BA₂	
640E	63.0
BA₂	
652	**66.7**

B = Sn.—(*Continued*)

°C ±10	M % A
BA₂	
650	70
630	80
580	90
545	95
A	
216	**100**

B = Pb (64, 132)

°C ±5	M % A
B	
325	**0**
AB	
802*	10

B = Pb.—(*Continued*)

°C ±5	M % A
AB	
856	15
895	20
943	30
982	40
1018	45
1088†	**50**

Two liq. layers from 67–100 M % A at 673° (liq. A + liq. A_2B) in equil. with solid A_2B (132).

* 820° (132).
† 1065° (132).

B = Tl (116, 131)

°C ±5	M % A
B	
287	**0**
B + B₂A	
281E	5†
B₂A	
361*	10†
361*	31†
367	**33.3**
365	35.4
351	39.2
B₂A + BA	
283E	40.0†
BA	
295	43
304	46
310	**50**
307	52.5
301	55.0
284	59.0
BA + B₂A₃(β)	
265U	60†
B₂A₃(β)	
254	65
227	70
B₂A₃(β) + B₂A₃(α)	
165U	72†
B₂A₃(α) + A	
150E	74†
A	
177*	80†
177*	98†
217	**100**

* Two liq. layers.
† ±1 M % A.

B = Zn (39)

A, M. P. = 217°.
B, M. P. = 419°.
Not miscible in liq. state.

B = Cd (38)

A, M. P. = 217°.
B, M. P. = 321°.
Not miscible in liq. state.

B = Cu (64)

°C ±2	M % A
B	
1084	**0**

B = Cu.—(*Continued*)

°C ±2	M % A
B	
1080	0.2
1069	0.6
B + AB₂	
1062E	0.8
AB₂	
1104	7.0
1105	20.0
1107	30.0
1114	**33.3**
947	39.1

B = Ag (64, 132, 135)

°C*	M % A
B	
962	**0**
918	5.0
896	10.0
892†	11.0
892†	30.0
B + AB₂	
841E	31.0
AB₂	
886	32.0
897	**33.3**
870	35.0
770	37.5
720	40.0
636	45.0
620†	45.1
616†	90.0
A	
217	**100**

* ±1 (0–30 M % A); ±5 (30–100 M % A).
† Two liq. layers.

B = Au (60)

No data obtained due to volatility of Se.

B = Al (36, 58, 111)

°C ±20	M % A
B	
648	**0**
B + AₓB_y	
640 to 648E	(?)
AₓB_y	
736	5
800	10
890	20
930	30
950	40
952	50
930	60
880	70
785	80
590	90
430	95
AₓB_y + A	
217(?)E	(?)
A	
217	**100**

$A_xB_y = A_4B_3$ (36); $= A_3B_2$ (58, 111).

Te

B = As (132)

°C	M % A
(?)	
358	50
(?) + A_3B_2	
355E	55
A_3B_2	
362	**60**
A_3B_2 + A	
329E	75
A	
452	**100**

B = Sb (54, 96, 103, 132)

°C ±2 (96, 103)	°C ±5 (54)	M % A
B		
629	**624**	**0**
588	598	10*
550	566	20*
B + A_3B_2		
540E		29*
A_3B_2		
554	565	40*
600	604	50*
622	**627**	**60**
590	608	70
547	518	80
A_3B_2 + A		
421E		89.5
	421E	85
A		
432	436	95
442	**446**	**100**

°C (132)	M % A
B	
632	**0**
B + A_3B_2	
538E	46*
A_3B_2	
595	65
563	80
A_3B_2 + A	
425E	94
A	
452	**100**

* (?) Mixed crystals.

B = Bi (3, 4, 114, 132)

°C ±1	M % A
B	
267	**0**
B + A_3B_2	
261E	1
A_3B_2	
294	5
334	10
402	20
452	30
499	40
539	50
561	55
573	**60**
570	65
562	70
521	80

B = Bi.—(*Continued*)

°C ±1	M % A
A_3B_2	
476	85
411	90
A_3B_2 + A	
388E	91.5
A	
408	95
428	**100**

B = Sn (20, 54, 99, 100)

See Fig. 4

°C	M % A
B	
232†‡	**0**
231*	**0**
B + AB	
232E†	(?)
231E*	(?)

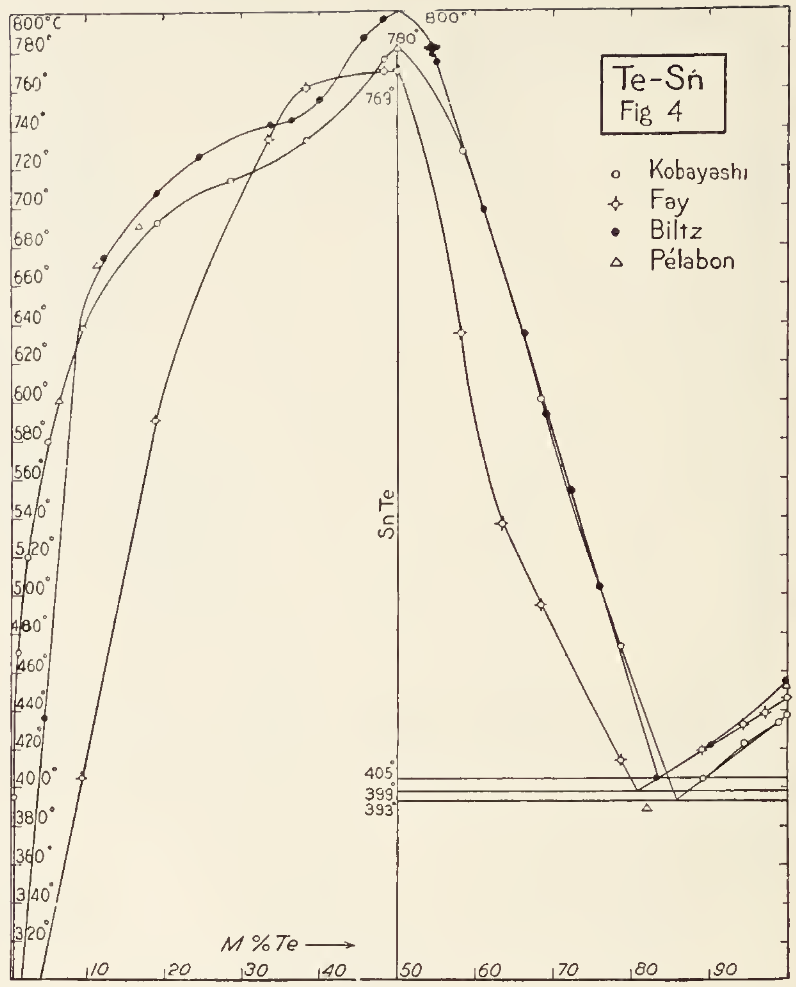
* (20) (Biltz). † (54) (Fay). ‡ (99, 100) (Kobayashi).

B = Pb (54, 97, 132)

°C ±10	M % A
B	
326	**0**
AB	
680	10
755	20
805	30
865	40
910	**50**
820	60
680	70
530	75
450	80
AB + A	
406E	85
A	
420	90
435	95
446	**100**

B = Tl (35, 132)

°C ±15	M % A	
B(β)		
294	**0**	
Mix.		
393*	33.5	2
393*	33.5	31
420	38	35
A_2B_3		
428	**40**	
390	45	
335	50	
A_2B_3 + AB		
305U	51.7†	
AB		
266	55	
252	60	
232	65	
AB + A		
200E	68.5†	
A		
220	70	
320	80	
382	90	
405	95	



B = Tl.—(*Continued*)

°C ±15	M % A
A	
453	**100**

Solid state: B(β)→B(α) at 230°.

* Two liq. layers. † ±2 M %.

B = Zn (101)

°C ±5	M % A
B	
418	**0**
BA	
1220.5	48.8
1238.5	**50.0**
1170	60.0
1070	70.0
940	80.0
750	90.0
A	
443.5	**100**

B = Cd (99, 100)

°C ±5	M % A
B	
322	**0**
AB	
692	0.88
1044	**50**
1000	60
890	70
810	80
710	85
680	90
580	95
A	
437	**100**

B = Hg (135)

°C ±5	M % A
AB	
560	65
553	66.6
532	70
499	75
461	80
AB + A	
410E	86
A	
422	90
436	95
451	**100**

B = Cu (33)

°C	M % A	
B		
1055	**0**	
1027.5*	1.0	
1027.5*	31.5	
890	32.0	
B + $AB_2(\gamma)$		
858U	**33.3**	
Mix.		
830	34	35.0
740	36.5	40.0
678	38.0	45.0
(Mix. + $A_3B_4(\beta)$)		
620U	40.0	50.5
$A_3B_4(\beta)$		
543	55.0	
450	60.0	
($A_3B_4(\beta)$ + $A_3B_4(\alpha)$)		
364.5U	66.0	

B = **Cu**.—(*Continued*)

°C	M % A
$A_3B_4(\alpha) + A$	
343E	69.0
A	
392	85.0
438	**100**

Solid state. $AB_2(\gamma) \rightarrow AB_2(\beta)$ at 384°; $AB_2(\beta) \rightarrow AB_2(\alpha)$ at 350°.

Values of M % A > 70 are *ca.* 2% too high, due to vaporization of Te.

B = **Ag** (41, 130, 132, 139, 155)

°C ±10	M % A
B	
961	**0**
938	2.5
916	5
$B + AB_2$(?)*	
866E	10
AB_2	
870	25
890	30
958	**33.3**
880	35
672	40
550	45
475	50
$AB_2 + AB(\beta)$	
442U	53.6
$AB(\beta)$	
422	55
$AB(\beta) + AB(\alpha)$	
410U	56
$AB(\alpha)$	
380	60
356	65
$AB(\alpha) + A$	
347.5E	67.5
A	
362	70
392	80
422	90
451	**100**

* Region from 10–27 M % A is uncertain.

B = **Au** (133, 140, 149)

°C	M % A
B	
1064	**0**
1045	2
1010	5
967	10
908	20
839	30
791	35
712	40
615	45
500	50
$B + A_2B$	
447E*	52
A_2B	
457	60
464	**67**
461	70
445	75

B = **Au**.—(*Continued*)

°C	M % A
A_2B	
444	80
426	85
$A_2B + A$	
416E†	87
A	
422	90
435	95
443	98
451	**100**

* 432° at 50 M % A (149); 452° at 55 M % A (133).

† 397° at 85.7 M % A (149); 415° at 88.7 M % A (133).

B = **Al** (40, 117)

°C ±10	M % A	
B		
649	**0**	
$B + A_3B_2$		
622E	0.5	
A_3B_2		
690	2.0	
730	4.0	
766	10	
800	20	
820	30	
830	40	
852	50	
870	55	
885	**60**	
Mix.(β)		
880	61	65
820	67	75
Mix.(β) + Mix.(α)		
541U	71	79
Mix.(α)		
475	71	80
Mix.(α) + A		
420E	71	90
A		
440	**100**	

Solid state: AB_5 forms at 551° at 0–60 M % A; from 551–700°, Mix. $(\beta) \leftrightarrows$ Mix.(α).

B = **Na** (138)

°C ±2	M % A
B	
97.5	**0**
AB_2	
560	10
740	20
860	25
959	**33.3**
868	37.5
715	40
579	42.5
483	45
381	47.5
$AB_2 + A_2B_3$	
348U	48.5
A_2B_3	
340	50
331	51.5
$A_2B_3 + A_7B_3$	
317E	53.8

B = **Na**.—(*Continued*)

°C ±2	M % A
A_7B_3	
341	55
389	57.5
412	60
432	62.5
435*	63.0
435*	75.0
430	77.5
423	80.0
$A_7B_3 + A$	
401.5E	83.5
A	
408	85
427	90
439	95
446	98
452	**100**

* Two liq. layers.

P

B = **Cu** (82)

°C ±10	M % A	
B		
1084	**0**	
1045	2.5	
1006	5.0	
969	7.5	
932	10.0	
891	12.5	
800	15.0	
$B + AB_3$		
707E	15.6	
AB_3		
808	17.5	
905	20.0	
960	22.0	
983	23.0	
1003	24.0	
AB_3 + Mix.		
1018(U?)	(?)	**25.0**
Mix.		
1023	(?)	25.5
1024	(?)	25.75
1023	(?)	26.0
1022	(?)	26.5

B = **Mn** (177)

B	
1260	0
1013 ↓	8
$B + A_2B_5$	
964E	9.5
A_2B_5	
977	10
1078	14
1162	18
1202	20
1295	24
1390	**28.6**
1373	30.0
1345	32.0
1270	36.0
1215	38.0
1130	40.0

B = **Mn**.—(*Continued*)

°C ±10	M % A
$A_2B_5 + AB$	
1095E	40.5
AB	
1120	41.0
1148	42.0
1172	44.0
1178	46.0
1180	47.0
1181	**50.0**

B = **Co** (178)

°C ±5	M % A
B	
1500	**0**
1410	5
1300	10
1174	15
$B + AB_2$	
1022E	19.8
AB_2	
1120	22
1190	24
1248	26
1295	28
1334	30
1367	32
1386	**33.3**
1382	33.7

B = **Ni** (102)

°C ±10	M % A	
B		
1484	**0**	
1010 ↓	15	
$B + AB_3$		
880E	19	
AB_3		
908	20	
953	22	
$AB_3 + A_2B_5(\beta)$		
975U	23.3	
$A_2B_5(\beta)$		
1010	24.0	
$A_2B_5(\beta) + A_2B_5(\alpha)$		
1025U	24.2	
$A_2B_5(\alpha)$		
1084	25.0	
1140	26.0	
1168	27.0	
1181	28.0	
1185	**28.6**	
Mix.*		
1160	29	30.0
1135	29.4	31.0
Mix. + AB_2		
1108E	29.8	32.2
AB_2*		
1112	**33.3**	
1108	34.0	
1092	35.0	
1048	36.0	

* Solid state: There is a transformation of "Mix." at 1000° and of Ni_2P at *ca.* 840°.

C

B = V [152]

°C ±10	M % A
B	
1715	**0**
B + AB(?)	
(?)E	(?)
AB(?)	
1890	5.0
2170	10

B = V.—(*Continued*)

°C ±10	M % A
AB(?)	
2355	15
2490	20
2600	25
2680	30
2730	35
2750	40
2760	**50**

Sec. 2. The A-Components are Elementary Substances; the B-Components are Compounds Whose Key-Formulae Do Not Begin with 16

Standard arrangement for both components (*v.* Vol. III, p. viii)

Cl_2

B = H_2O [12, 13]

°C	M % Cl ±0.01
H_2O + $Cl(H_2O)x$	
− 0.24E	0.125
$Cl(H_2O)x$	
0.00	0.130
+ 2.0	0.163
4.0	0.186
6.0	0.209
8.0	0.232
9.0	0.245
20.0	0.470
28.7*	0.930

x = 8 [12, 13]; = 6 [29.5].

* Two liq. layers.

B = HCl [106]

°C ±0.1	M % A
B	
−112	**0**
−122.6	10
B + A	
−127.5E	14.5
A	
−124.9	20
−120.4	30
−116.5	40
−112.9	50
−109.9	60
−107.3	70
−105.0	80
−103.1	90
−101.5	**100**

B = SO_2 [72, 73, 158]

In the dark

°C ±0.3	M % A
B	
− 75.2	**0**
− 80.6	10
− 83.3	20
− 84.9	30
− 86.1	40
− 87.1	50
− 87.8	60
− 88.5	70
− 89.2	75
− 90.5	80
− 95.0	90
−100.1	95
B + Mix.	
−102.2E	96.5*

B = SO_2.—(*Continued*)

°C ±0.1	M % A
A	
−100.9	**100**
In the light	
B	
− 75.2	**0**
B + BA	
(?)E	(?)
BA	
− 79.8	30
− 69.4	40
− 62.4	45
− 54.1 ↓	**50**
−106.3	80
BA + A	
−109.1E	81.7
A	
−107.5	85
−105.1	90
−102.9	95
−100.9	**100**

* 98.5 at −102.3°C [158].

B = NOCl [26]

°C ±1*	M % A
B	
− 64.5	**0**
− 72.5	10
− 80.5	20
− 88.5	30
− 97.0	40
−105.0	50
−107	54
(?)†	
−107.5	57.5
(B + A)(?)†	
−112E?	57.5
(?)†	
−107.5	60
−106	65
A	
−103.5	70
−101	75
− 99	80
− 97	85
− 95.5	90
− 95	95
− 94.4	**100**

* This is the mean between t_L and t_S where $t_L - t_S \ngtr 6.5°$.

† It is possible that an unstable compound is formed in this region.

B = $AsCl_3$ [21]

°C ±2	M % A
B	
− 16.0	**0**
− 22.0	10
− 28.0	20
− 34.5	30
− 41.5	40
− 48.5	50
− 56.5	60
− 66.0	70
− 79.0	80
− 88.0	85
− 98.0	90
B + A	
−107.0E	93.5 ± 1
A	
−100.9	**100**

B = $SiCl_4$ [21]

°C ±0.5	M % A
B	
− 68.0	**0**
− 72.5	10
− 78.0	20
− 84.5	30
− 91.5	40
− 99.0	50
−107.0	60
−115.0	70
B + A	
−116.5E	72 ± 1
A	
−113.0	80
−107.5	90
−100.9	**100**

B = $TiCl_4$ [21]

°C ±1.5	M % A
B	
− 22.5	**0**
− 28.5	10
− 35.0	20
− 42.0	30
− 49.0	40
− 57.0	50
− 67.5	60
− 82.0	70
− 91.0	75
−102.0	80
B + A	
−108.0E	82 ± 1
A	
−105.5	90
−100.9	**100**

B = $SnCl_4$ [21]

°C ±2	M % A
B	
− 33.0	**0**
− 37.5	10
− 43.0	20
− 50.0	30
− 58.0	40
− 67.5	50
− 79.0	60
− 86.0	65
− 96.5	70

B = $SnCl_4$.—(*Continued*)

°C ±2	M % A
B + A	
−105.0E	72.5 ± 1
A	
−100.9	**100**

Compn. of solid phase over 0–29 M % A is somewhat doubtful.

Br_2

B = H_2O [13, 71, 175]

°C	M % A
B	
0.00	**0**
B + AB_8	
−0.3E	0.347
AB_8	
0.0	0.265‡
0.0	0.270*
+3.0†	0.344*
5.12	0.427‡
6.0	0.406*
6.2	0.411*
7.5§	0.407†
+7.5§	99.5†
A	
−7.5	**100**

* [13]. † [71]. ‡ [175].

§ Two liq. layers.

B = HBr [32]

°C ±0.2	M % A
B	
−87.3	**0**
−87.8	1
−88.5	2
−90.8	3
B + A	
−95E	4
A	
−87	5
−72.2	10
−58.2	20
−49.0	30
−42.2	40
−35.8	50
−29.8	60
−23.8	70
−18.2	80
−12.5	90
− 7.5	**100**

Composition of solid phases somewhat doubtful.

B = SO_2 [72, 73]

°C ±0.2	M % A
B	
−75.1	**0**
B(?) + A	
−75.5E	1
A	
−56	2.5
−42	5.0
−28.5	10.0
−22.5	15.0
−18.8	20.0
−15.2	30.0

B = SO_2.—(*Continued*)

°C ±0.2	M % A
A	
−14.0	50.0
−13.8	70.0
−13.0	80.0
−11.0	90.0
− 9.3	95.0
− 7.1	**100**

Equil. is not changed by light, darkness, or presence of catalysts.

B = **NO** [165]

°C ±1	M % A
B_2A	
−55.7	**33.3**
−57.5	35.0
−63.3	40.0
$B_2A + B_2A_3$	
−66.0E	42.0
B_2A_3	
−56.5	45.0
−46.5	50.0
−41.5	55.0
−40.0	60.0
−42.0	65.0
B_2A_3 + A	
−47.0E	70.5
A	
−33.5	75.0
−24.0	80.0
−16.5	85.0
− 7.5	**100**

Compn. of solid phases somewhat uncertain.

I_2

B = H_2O [56, 77, 79, 92, 93, 118, 155.5, 156]

v. also p. 266

°C	10^5 M % A ±2
A	
0	116
15	180
18	196
20	207
25	241
35	331
45	459
55	655

B = HgI_2 [121]

°C	M % B
A	
112 ↓	**0**
103.6 ↓	10
A + B	
100.8E	13.2
B	
112.5 ↓	20
134.5 ↓	32.5

B = CaI_2 [121]

°C	M % B
A	
112	**0**
99	7.9
82.6	15.0

B = CaI_2.—(*Continued*)

°C	M % B
A	
72.7	20.0
A + (?)	
71.0E	21
(?)	
73.4	23.0
74.7	25.0
74.8	27.3
74.8	30.8
74.5	43.4
77.2	54.9

B = **KI** [1, 104, 127]

°C ±1*	M % B
A	
112	**0**
108.5	5
102	10
92.5	15
81.5	20
A + A_3B_2(?)	
77.5E	22
A_3B_2(?)	
79	30
80	**40**
79	45
A_3B_2(?) + B(?)	
75E	50

* From 0–20 M % B.

S_8

B = H_2S_2* [172]

°C	M % A
A	
−35	2.5
−30	5.5
−20	13.0
−10	22.5
− 1.45	33.3†
0	34.0
+10	39.0
20	43.5
25	45.6
30	47.7
40	52.2
50	57.2
55	60.0

* The same equil. is obtained with H_2S_3.

† A sharp break in the curve here indicates the formation of H_2S_6.

B = NH_3 [151]

°C ±0.2	M % A
B	
−77.3	**0**
−78.2	0.5
−79.1	1.0
B + $B_6A_{1/8}$	
−79.6E	1.275
$B_6A_{1/8}$	
−79.4	1.30
−78.9	1.40
−78.6	1.50
−78.5	1.60
−78.4	1.80
−78.3	**2.07**

B = NH_3.—(*Continued*)

°C ±0.2	M % A
$B_6A_{1/8}$	
−79.9	2.50
−81.7	3.00
−83.3	3.50
−84.5	4.00
A	
−20	3.92
0	3.08
+15	2.30
30	1.73
40	1.48
45	1.38

The nearly const. soly. of A in B from −20 to −84° indicates the formation of $S(NH_3)_3$.

B = $SnCl_4$ [66]

°C	M % A
A	
99	5.56
101	5.92
A (liq.)	
110	8.29
112	8.92
121	14.72

B = SnI_4 [48.5]

°C	Wt. % B
130	90.8
104	76.2

B = $HgCl_2$ [122]

°C ±1	M % A
B	
287	**0**
284	2.5
281	5.0

B = $HgCl_2$.—(*Continued*)

°C ±1	M % A
B	
277.5*	6.8
277.5*	89.5
A	
117	**100**

Se_8

B = $HgCl_2$ [122]

°C ±1	M % A
B	
287	**0**
280	5
272.3*	11
272.3*	83
A	
218	**100**

B = $HgBr_2$ [125]

°C ±0.2	M % A
B	
236	**0**
232.2	2.5
230.2	5.0
227.4*	9.5
227.4*	40.5
226.7	45
225.7	50
224.5	55
223	60
221	65
B + A	
210 to 211E	75 ± 5
A	
217	**100**

* Two liq. layers.

Sec. 3. The A-Components are Elementary Substances in Standard Arrangement; the B-Components are Compounds (in ℭ-Arrangement) Whose Key-Formulae Begin with 16 (*v.* Vol. III, p. viii)

Cl_2

B = CCl_4 [21]

°C ±1	M % A
B	
− 22	**0**
− 31.5	5
− 41.5	10
B + (?)	
− 48.0U	13.5 ± 1
(?)	
− 48.5	15
− 51.5	20
− 55.0	25
− 58.5	30
− 62.5	35
− 67.5	40
− 78.0	50
− 91.0	60
−107.0	70
(?) + A	
−115.0E	75 ±1
A	
−106.0	90
−102.0	**100**

B = CO_2 [163]

°C	M % B
B	
−78.60	82.5*

* 93.1 vol. % in vapor phase at p = 750 mm.

B = C_3H_6O [106]

Acetone

°C ±1	M % A
BA	
− 80	15
− 73.7	20
− 68.2	25
− 68.5	30
− 59.5	35
− 56.7	40
− 54.7	45
− 54.0	**50**
− 55.0	55
− 57.0	60
− 60.2	65
− 65.3	70
− 74.0	75
− 98.5	85

Cl_2.—(*Continued*)

B = C_3H_6O.—(*Continued*)

°C ±1	M % A
BA + A	
−104.0E	90
A	
−102.7	95
−101.5	**100**

U possible at −95° and 82 M % A.

B = $C_4H_8O_2$ (106)
Ethyl acetate

°C ±0.5	M % A
B	
− 83.0	0
− 85 6	10
− 89.0	15
B + BA_2	
− 92.0E	18
BA_2	
− 90.2	20
− 85.7	25
− 81.7	30
− 78.3	35
− 75.5	40
− 73.1	45
− 71.3	50
− 69.9	55
− 68.9	60
− 68.2	**66.7**
− 69.1	70
− 71.5	75
− 75.6	80
− 82.0	85
− 92.0	90
BA_2 + A	
−104.0E	94
A	
−102.5	97.5
−101.5	**100**

B = $C_4H_{10}O$ (113)
Ethyl ether

°C ±1	M % A
B	
−118	**0**
BA	
−100	2.5
− 90	5.0
− 80	10.0
− 70	20.0
− 60	30.0
− 52	40.0
− 50	45.0
− 49	**50.0**
− 50	55.0
− 52	60.0
− 55	65.0
− 58.5	70.0
− 64	75.0
− 72	80.0
− 86	85.0
− 94	87.5
BA + A	
−105E	90.0

B = $C_4H_{10}O$.—(*Continued*)

°C ±1	M % A
A	
−102.5	95.0
−101.5	**100**

B = C_7H_8 (106)
Toluene

°C*	M % A
B	
− 94.0	0
− 98.0	5
−104.0	10
B + BA	
−114.0E	16
BA	
−110.2	25
−107.5	30
−104.5	35
−101.5	40
− 99.5	45
− 98.0	**50**
− 99.5	57.5
BA + BA_2	
−102.5E	62
BA_2	
−101.5	65
−101.5	**66.6**
−102.0	72.5
−103 0	75
−107.2	80
BA_2 + A	
−112.0E	85.5
A	
−109.5	90
−106.0	95
−101.5	**100**

* ±2 (0–16 M % A); ±0.5 (16–100 M % A).

Br_2

B = CBr_4 (21)

°C	M % A
B	
88.5*	**0**
58.5†	10
B + (?)	
48.0U†	13.5‡
(?)	
34.5§	25
5.7§	50
(?) + A	
−23.0E§	75‡
A	
−20.2‖	80
−13.7‖	90
− 7.3¶	**100**

* ±1.5°. § ±2°.
† ±4°. ‖ ±0.5°.
‡ ±1 %. ¶ ±0.2°.

B = CS_2 (8)

°C	M % A
A	
− 95	28.37
−110.5	23.35
−116	21.79

B = CH_4O (106)
Methyl Alcohol

°C ±1	M % A
B	
− 97.0	**0**
−103.5	5.0
B + BA_2(?)	
−106.5E	7.5
BA_2(?)	
− 95.0	10.0
− 86.7	12.5
− 80.0	15.0
− 75.0	17.5
− 71.5	20.0
− 67.0	25.0
− 65.0	30.0
− 64.5(?)	**33.3**
BA_2(?) + A	
−64.7E(U?)	33.5
A	
− 61.5	35.0
− 50.5	40.0
− 42.0	45.0
− 35.0	50.0
− 24.5	60.0
− 17.5	70.0
− 13.0	80.0
− 10.0	90.0
− 7.3	**100**

B = C_2H_5Br (176)

°C ±1.5	M % A
B	
−115.5	**0**
−116.7	5
B + BA_x	
−118E	10*
BA_x	
−109	15
−102	20
− 96	25
− 91	30
− 86.7	35
− 83	40
− 80	45
BA_x + A	
− 78U	50*
A	
− 55	60
− 37.5	70
− 24.5	80
− 14.5	90
− 7.3	**100**

* ±1 %.

B = C_2H_6O (106)
Ethyl alcohol

°C ±0.5	M % A
B_2A	
−92.0	12.5
−87.5	15.0
−80.0	20.0
−74.2	25.0
−70.0	30.0
−67.5	**33.3**
−68.0	35.0
−69.0	37.5
−71.3	40.0

B = C_2H_6O.—(*Continued*)

°C ±0.5	M % A
B_2A + BA_2(?)	
−76.0E	43.5*
BA_2(?)	
−71.2	45.0
−63.5	47.5
−52.2	50.0
−47.5	55.0
−40.8	60.0
−36.0	65.0
−35.0(?)	**66.7**
BA_2(?) + A	
−34.5E(U?)	67.0*
A	
−25.5	70.0
−18.5	75.0
−14.3	80.0
−11.5	85.0
− 9.3	90.0
− 8.0	95.0
− 7.3	**100**

* ±1 %.

B = C_3H_6O (106)
Acetone

°C ±0.5	M % A
BA	
−76	5
−53.5	10
−39.0	15
−29.5	20
−22.0	25
−17.5	30
−12.3	35
− 9.2	40
− 7.5	45
− 7.0	**50**
−12.0	55
−19.0	60
−28.0	65
BA + A	
−35.0E	68*
A	
−33.0	70
− 7.3	**100**

* ±1 %.

B = $C_4H_8O_2$ (106)
Ethyl acetate

°C ±1	M % A
B	
−83.0	**0**
B + BA(?)	
−86.0E	3
BA(?)	
−80.5	5
−75.0	7.5
−71.5	10.0
−68.5	12.5
−60.0	21.5
−55.5	25
−50.0	30
−45.0	35
−41.0	40
−38.0	45
−36.0	50
−34.5	**55***

C = $C_4H_8O_2$.—(*Continued*)

°C ±1	M % A
BA(?)	
−35	60
−36.5	65
BA(?) + A	
−37.5E	68.5
A	
−36.0	70
−29.5	75
−24.0	80
−19.0	85
−14.5	90
−10.5	95
− 7.3	**100**

* Max. does not coincide with the composition, BA.

B = $C_4H_{10}O$ (113)
Ethyl ether

°C ±1	M % A
B	
−118	**0**
B + BA_2(?)	
−121E	4
BA_2(?)	
−117	5
−105	7.5
− 94.5	10.0
− 85.5	12.5
− 78.0	15.0
− 67.0	20.0
− 59.0	25.0
− 52.5	30.0
− 47.0	35.0
− 43.0	40.0
− 40.0	45.0
− 38.5	**50.0**
BA_2(?) + B_2A_3	
?E(U?)	(?)
B_2A_3	
− 12.0	57
+ 23.0	**60**
− 3	70
B_2A_3 + A	
− 23.0E	77
A	
− 21.0	80
− 14.0	90
− 7.3	**100**

I_2

B = CCl_4 (83, 85)

°C	M % A ±0.02
A	
0	0.418
10	0.631
20	0.920
25*	1.10
40	1.69
50	2.68

* At 25°, 0.237 g-mole of A soluble in 1 l soln. (A + B) (80).

B = CS_2 (7, 85, 88)

°C	M % A ±0.5
A	
−110	0.046
−100	0.049
− 90	0.060
− 80	0.085
− 70	0.140
− 60	0.220
− 50	0.335
− 40	0.495
− 30	0.740
− 20	1.12
− 10	1.68
0	2.4
+ 10	3.40
20	4.90
30	6.68
40	9.20
50	12.7

At 18°, 177 g A per l solution (6).

B = $CHBr_3$ (166)

°C	M % A
A	
25	6.6

B = $CHCl_3$ (8, 49, 74, 88, 109)

°C	M % A ±0.02	
A		
−75	0.037	
−70	0.041	(88)
−60	0.058	0.040
−50	0.085	0.070
−40	0.122	0.107
−30	0.175	0.167
−25	0.210	
−20	0.251	
−15	0.305	
−10	0.39	
− 5	0.48	(85)
0	0.58	0.93
+10	0.84	1.40
20	1.21	1.95
30	1.775	2.70
40		3.80
50		5.30

At 25°, 0.352 g-mole of A soluble in 1 l soln. (A + B) (80).

B = CHI_3 (124)

°C ±0.5	M % A	
Mix.(?)		
119.7	**0**	
114.3	10	
108.7	20	
102.8	30	
96.8	40	
90.7	50	
84.7	60	
Mix.(?) + Mix.(?)		
82.5E	63	

B = CHI_3.—(*Continued*)

°C ±0.5	M % A	
Mix.(?)		
84.3	65	
88.8	70	
93.0	75	
97.5	80	
101.7	85	
105.7	90	
109.3	95	
113	**100**	
Mix_1 + Mix_2 (168)		
66.1E	24.9	53.2
	73.3	53.2

B = C_2Cl_4 (80)
Tetrachloroethylene

°C	s*
25	0.241

B = C_2HCl_5 (80)
Pentachloroethane

°C	s*
25	0.272

B = $C_2H_2Cl_2$ (80)
Acetylene dichloride

°C	s*
25	0.312

B = $C_2H_2Cl_4$ (80)
1, 1, 2, 2-Tetrachloroethane

°C	s*
25	0.244

* s = solubility of A in g-mole per l solution (A + B).

B = C_3H_6O (88)
Acetone

°C	M % A ±0.02
B(?)*	
−84	0.62
−80	1.05
−70	2.02
−60	2.90
(?) + (?)	
−54.75U	3.33
°C	M % A ±0.08
A(?)*	
−52.5	2.85
−50	2.50
−45	2.05
−40	1.73
−35	1.49
−30	1.28
−25	1.11
−20	0.96
−15	0.84
−10	0.72
− 5	0.63
0	0.54

* Mixed crystals (?).

B = $C_4H_{10}O$ (8, 88, 109)
Ethyl ether

°C	M % A ±0.08
A	
−108	4.22
−100	4.26
− 90	4.30
− 80	4.35

B = $C_4H_{10}O$.—(*Continued*)

°C	M % A ±0.08
A	
−70	4.43
−60	4.54
−50	4.70
−40	4.92
−30	5.23
−25	5.43
−20	5.66
−15	5.96
−10	6.31
− 5	6.68
0	7.07
+25	9.29

B = $C_4H_{12}IN$ (121)
Tetramethylammonium iodide

°C ±0.2	M % B
A	
112	**0**
105	5.0
98	10.0
A + A_4B(?)	
91E	14.75
A_4B(?)	
92	15.0
98	16.0
103.5	17.0
106.0	18.0
106.5	19.0
106.4	**20.0**
105.0	21.0
102.5	22.0
A_4B(?) + A_3B(?)	
98.5E	22.75
A_3B(?)	
98.5	23 0
98.4	24.0
98.3	**25.0**
98.2	26.0
A_3B(?) + A_2B	
98.2E	26.5
A_2B	
105.0	27.0
114 5	28.0
122.0	29.0
124.5	30.0
125.5	31.0
126.0	32.0
126.0	**33.3**
124.2	35.0
119.5	37.5
111.0	40.0
A_2B + AB	
99.0E	42.5
AB	
110.5	45.0
117.0	47.5
118.5	**50.0**
117.5	52.0
(?)	
117.6	55.0

I_2.—(*Continued*)

B = $C_6H_4Br_2$ (124)
p-Dibromobenzene

°C ±0.5	M % A
B*	
88.5	0
86.3	5
84.4	10
82.7	15
79.5	20
77.0	25
B* + A*	
76.0E	26.2
A*	
78.2	30
84.5	40
88.5	45
92.5	50
97.5	60
100.7	70
103.5	80
106.0	90
113	**100**

* Mixed crystals(?).

B = $C_6H_4N_2O_4$ (124)
p-Dinitrobenzene

°C ±0.5	M % A
B*	
↓**90.5**	0
85.0	15
B* + A*	
83.5E	19
A*	
87.0	20
93.5	22.5
98.5	25
103.0	27.5
107.5	30
109.2†	31
109.2†	>94
113.5	**100**

* Mixed crystals(?).
† Two liq. layers.

B = C_6H_6 (5, 8, 85)
Benzene

°C	M % A ±0.1
B*	
5.4	**0**
5.2	0.4
B* + A*	
4.6E	2.55
A*	
10	3.07
15	3.60
20	4.20
25	4.82†
30	5.50
35	6.80
40	7.18
45	8.20
50	9.5
51.6	10.0

* May be mixed crystals.
† 5.45 (5).

B = C_6H_{14} (83, 85)
Hexane

°C	M % A
A	
25	4.5 ± 0.02

B = $C_7H_6O_2$ (124)
Benzoic acid

°C ±0.5	M % A
B*	
↓**122.8**	**0**
111.8	20
B* + A*	
107.5E	28
A*	
108.1	30
109.0	35
110.0	40
110.8	45
111.5†	50
111.5†	>95
113	**100**

* Mixed crystals (?).
† Two liq. layers.

B = C_7H_{16} (83, 85)
Heptane

°C	M % A ±0.02
A	
0	0.245
10	0.376
20	0.565
25	0.679
40	1.19
50	1.70

B = $C_9H_{14}IN$ (121)
Trimethylphenyl-ammonium iodide

°C ±0.2	M % B
A	
112	**0**
101.5	2.5
90.2	5.0
78.3	7.5
65.6	10.0
51.7	12.5
A + A_4B	
45.0E	13.7
A_4B	
47.8	15.0
52.5	17.5
54.5	19.0
55.3	**20.0**
55.2	20.5
A_4B + A_3B	
55.1E	21.2
A_3B	
58.2	22.0
61.3	23.0
62.7	24.0
63.2	**25.0**
A_3B + A_2B	
63.0E	26.0
A_2B	
69.5	27.0
73.8	28.0
77.0	29.0
79.5	30.0

B = $C_9H_{14}IN$.—(*Continued*)

°C ±0.2	M % B
A_2B	
81.5	31.0
83.0	32.0
83.5	**33.3**
83.2	34.0
83.0	35.0
82.2	36.0
80.7	37.0
A_2B + AB	
79.5E	37.8
AB	
89.5	40.0
98.8	42.5
106.2	45.0
111.2	47.5
112.6	**50.0**
111.6	52.5
109.2	55.0
104.9	58.7

B = $C_{10}H_8$ (170)
Naphthalene

°C	M % A
B + A	
65.5E	24.72

B = $C_{12}H_{10}N_2$ (124)
Azobenzene

°C ±0.5	M % A
B*	
68.2	**0**
65.3	10
61.6	20
B* + A*	
57.2E	30
A*	
64.0	32.5
72.5	35
80.0	37.5
85.5	40
89.0	42.5
91.5	45
94.5	50
96.7	55
98.2	60
100.3	70
102.3	80
105.5	90
113	**100**

* Mixed crystals(?).

B = $C_{14}H_{10}O_3$ (124)
Benzoic anhydride

°C ±0.5	M % A
B*	
↓**40.3**	**0**
37.0	5.0
B* + A*	
36.7E	5.3
A*	
42.5	7.5
50.0	10
62.5	15
73.0	20
81.5	25
88.3	30
94.3	35

B = $C_{14}H_{10}O_3$.—(*Continued*)

°C ±0.5	M % A
A*	
99.5	40
104.2	45
108.2	50
110.2†	52.5
110.2†	>90
113	**100**

*Mixed crystals(?). †Two liq. layers

S_8

B = CCl_4 (47, 86, 87)

°C	M % A ±0.02
A	
0	0.203
10	0.294
15	0.355
20	0.425
25	0.500
35	0.697
40	0.812
45	0.944
50	1.085
54	1.212
60	1.420

B = CS_2 (5, 8, 45, 52, 88)

°C	M % A*	
	A	
−120		0.85†
−110	0.30	1.00
−100	0.44	1.15
− 90	0.59	1.30
− 80	0.75	1.45
− 70	0.95	1.60
− 60	1.22	
− 50	1.60	
− 40	2.10	
− 30	2.75	
− 20	3.60	
− 10	4.60	
0	6.15	
+ 10	8.2	
20	10.8	
30	15.7	
40	22.0	
45	25.1	
47	28.5	
50	29.5	
60	35.0	
70	42.5	
80	52.0	
90	63.0	
100	77.0	

* ±<0.5 % (−11 to +55°) (45); ±<0.02 % (−13 to −109.50°) (88), ± <0.2 % (−61 to +100°) (52).
† Values in this column from (8).

B = CH_2I_2 (147)
Methylene iodide

°C	M % A
A	
10	9.46

B = C_2Cl_4 (87)
Tetrachloroethylene

25	0.9794

B = C_2HCl_3 (73, 87)
Trichloroethylene

°C	M % A
15	0.595
25	0.826

B = C_2HCl_5 (87)
Pentachloroethane

°C	M % A
25	0.935

B = $C_2H_2Cl_2$ (87)
Acetylene dichloride

°C	M % A
25	0.480

B = $C_2H_2Cl_4$ (87)
Tetrachloroethane

°C	M % A
25	0.798

B = $C_2H_4Cl_2$ (86)
Ethylene chloride

°C	M % A
25	0.322
40	0.537

B = $CHCl_3$ (30, 45, 47)

°C	M % A ±0.02
	A
10	0.325
15	0.405
20	0.500
25	0.610

g A per 100 cm³ solution

°C	S_m*	S_{rh}†
0	1.101	0.788
15.5	1.658	1.253
40	2.9	2.4

* m = monoclinic. † rh = rhombic.

B = $C_2H_4Br_2$ (52)
Ethylene bromide

°C	M % A ±0.05
	A
0	0.48
10	0.575
20	0.760
25	0.885
30	1.05
40	1.48
50	2.19
60	3.02
70	4.18
80	5.92
90	9.00
95	12.6

B = C_2H_5Br (30)
Ethyl bromide

°C	S_m*	S_o*
0	8.52	6.11
25.3	16.76	13.07

B = C_2H_6O (30)
Ethyl alcohol

°C	S_m*	S_o*
25.3	0.66	0.52

B = C_3H_6O (78)
Acetone

°C	M % A
25.0	0.613

* Solubility of A in g per l solution. S_m = monoclinic; S_o = orthorhombic.

B = $C_3H_6O_2$ (30)
Ethyl formate

°C	S_m*	S_o*
0	0.28	0.19

B = $C_3H_8O_3$ (128)
Glycerol

°C	M % A
15.5	0.050

B = $C_4H_{10}O$
Ethyl ether

°C (47)	M % A
13.0	0.0543
23.0	0.0817

°C(30)	S_m*	S_o*
0	1.13	0.80
25.3	2.53	2.00

* Solubility of A in g per l solution. S_m = monoclinic; S_o = orthorhombic.

B = $C_4H_8Cl_2S$ (174)
Di-(2-chloroethyl) sulfide (mustard gas)

°C ±0.5	M % A
	B
13.82*	**0**
13.67*	0.5
	B + A(rh)†
13.65E	0.56
	A(rh)†
30.0	1.0
43.0	1.5
52.5	2.0
65.5	3.0
74.2	4.0
	A(m)†
80.8	5.0
85.7	6.0
92.5	8.0
97.2	10.0
101.2	12.5
104.0‡	14.5
104.0‡	85.0
107.5	90.0
110.7	95.0
113.0	**100**

°C	M % A liq. layers Upper	Lower
104	14.5	85.0
110	17.3	83.5
115	19.5	81.7
120	21.8	79.7
125	24.0	77.0
130	26.7	73.6
135	30.8	68.7
143 crit.	48.2	48.2

* ±0.01.
† (rh) = rhombic; (m) = monoclinic.
‡ Two liq. layers.

B = $C_5H_{12}O$ (66)
Amyl alcohol

°C	M % A
	A
95	0.51†
110	0.73†
112*	0.80‡

B = $C_5H_{12}O$.—(*Continued*)

°C	M % A
	A
120*	1.02‡
131*	1.8‡

* Two liq. phases. † ±0.02 %.
‡ ±0.2 %.

B = $C_6H_4Cl_2$ (31)
p-Dichlorobenzene

°C ±0.1	M % A
	B
52.9	0
51.55	3
	B + A(rh)*
51.0E	4.2
	A(rh)*
67.8	6
81.5	10
90.0	15
94.8	20
	A(m)*
97.5†	27
97.5†	78.5
113.0	**100**

°C	M % A liq. layers Upper	Lower
97.5	27	78
100.0	32	70
102.5	40	60
103.5 crit.	46	46

* (rh) = rhombic; (m) = monoclinic. † Two liq. layers (±1°).

B = C_6H_6 (5, 30, 45, 47, 52, 86)
Benzene

°C	M % A ±0.04
	A
0	0.31
10	0.43
20	0.60
30	0.84
40	1.13
50	1.50
60	2.00
70	2.77
80	3.80
90	5.00
100	6.50
110	8.6†
113*	11†

°C (52, 105)	M % A ± 2 % liq. layers Upper	Lower
120	11.5	65.5
130	14.5	62.0
140	18.0	58.0
150	22.5	53.0
162 crit.	38.0	38.0
(220 to 225) crit.	(40 to 45)	(40 to 45)
230	27.5	54.5
240	21.7	58.0
250	18	59.5
260	16	60.5
270	14	62.0

* Two liq. layers (?).
† Less precision in these values.

B = C_6H_7N (48)
Aniline

°C	M % A
130	23.6

B = C_6H_{14} (52)
Hexane

°C	M % A*
	A
− 20	0.0235
− 10	0.041
0	0.0540
+ 10	0.080
20	0.100
25	0.112
50	0.25
68	0.434
130†	1.81
142†	2.14
184†	2.98

* Relative precision ±1 % of values given.
† Liquid A.

B = C_7H_8 (47, 86)
Toluene

°C	M % A ±0.025
	A
0	0.324
10	0.472
20	0.650
25	0.750
30	0.865
35	0.995
40	1.14
45	1.33
50	1.57
54	1.797
60	2.21*
70	3.08*
80	4.13*
83.5	4.52

* Less precision in these values.
A mixture of x g A in 100 g A + B was heated at $t°$ for n hours, cooled to 0° and stirred at 0° for one hour after addition of a trace of octahedral A. The solubility of A at 0° in these solutions follows (11):

x	M % A
$t°$ = 140; n = 6 hr	
3.4	0.427
6.2	0.514
9.2	0.595
22.0	0.982
27.6	1.184
$t°$ = 150°; n = 4 hr	
3.6	0.449
6.6	0.543
10.6	0.650
22.6	1.083
30.1	1.300
$t°$ = 160°; n = 2 hr	
3.2	0.449
6.2	0.558
15.0	0.874
21.6	1.109
30.0	1.338

S_8.—(*Continued*)

B = C_7H_{16} (86)
Heptane

°C	M % A ±0.005
0	0.048
10	0.080
20	0.120
25	0.141
35	0.201
45	0.274
54	0.363

A

B = C_8H_{10} (86)
m-Xylene

°C	M % A
25	0.825
30	0.96*
40	1.31*
45	1.523
50	1.81*
60	2.49*
70	3.41*
80	4.53

A

* Interpolated, assuming curve is similar to that in toluene.

Se_8

B = CS_2 (148); *cf.* (107, 108)

°C	M % A
25	86*
25	49†

A

* Amorphous.
† Hexagonal.

P_4

B = CS_2 (44, 68)

°C	M % A ±1
−80	2.7
−50	6.3
−25	11.7
−20	13.5
−15	16.5
−10	21.5
− 7.5	25.0

A

B = CS_2.—(*Continued*)

°C	M % A ±1
− 5	31.0
− 3.5	55.0
− 3.0	61.0
− 2	70.0
0	74.0
+ 2.5	78.0
5	80.5
10	83
25	89

A

°C ±0.5 | M % A (84)
No solid phase, two liq. layers

°C ±0.5	M % A
−7.9	5
−7.0	25
−6.7	35
−6.4	50
−6.4	60
−6.6	75

From these data, a satd. soln. of A in B is stable below −7° and metastable above −7° while the two liq. layers are metastable below −7°.

B = C_6H_6 (69)
Benzene

°C	M % A ±0.1
5	0.36
10	0.72
20	1.43
30	2.16
40	(2.87)
50	(3.60)
60	4.32
70	5.04
80	5.76
90	6.48
100	7.21
110	7.93
115	8.30

M % A = 0.0722*t*. No original data between 36° and 58° are given, but it is probable that at >44° two liq. phases are present.

Sec. 4. Cryoscopic Data. Freezing-Point Lowering, Δ*t*. A = Solvent; B = Solute

Both in standard (resp. ℭ-) arrangement (*v.* Vol. III, p. viii)

Cl_2

B = CCl_4 (171)

Δ*t*°C ±0.0025	M % B
0.208	0.50
0.417	1.00
0.625	1.50
0.833	2.00

Δ*t*° = 0.417 M % B.

B = $CHCl_3$ (171)

Δ*t*°C ±0.01	M % B
0.213	0.50
0.430	1.00
0.645	1.50
0.860	2.00

Δ*t*° = 0.430 M % B.

B = CH_4O (171)
Methyl alcohol

Δ*t*°C ±0.005	M % B
0.029	0.50
0.058	1.00
0.087	1.50
0.116	2.00
0.145	2.50
0.175	3.00
0.232	4.00
0.290	5.00

Δ*t*° = 0.058 M % B.

B = C_2H_6O (171)
Ethyl alcohol

Δ*t*°C ±0.005	M % B
0.065	0.50
0.120	1.00
0.168	1.50
0.207	2.00
0.244	2.50
0.280	3.00
0.355	4.00
0.450	5.00

B = C_3H_6O (171)
Acetone

Δ*t*°C ±0.0025	M % B
0.197	0.50
0 380	1.00
0.545	1.50
0.700	2.00
0.850	2.50

B = $C_4H_8O_2$ (171)
Ethyl acetate

Δ*t*°C ±0.005	M % B
0.192	0.50
0.388	1.00
0.588	1.50
0.800	2.00

B = $C_4H_{10}O$ (171)
Ethyl ether

Δ*t*°C ±0.0025	M % B
0.208	0.50
0.417	1.00
0.625	1.50
0.832	2.00

Δ*t*° = 0.416 M % B.

B = C_7H_8 (171)
Toluene

Δ*t*°C ±0.005	M % B
0.217	0.50
0.433	1.00
0.650	1.50

Δ*t*° = 0.433 M % B.

B = $SnCl_4$ (171)

Δ*t*°C ±0.02	M % B
0.036	1.0
0.071	2.0
0.103	3.0
0.132	4.0
0.160	5.0
0.192	6.0
0.230	7.0
0.268	8.0
0.305	9.0

B = $SnCl_4$.—(*Continued*)

Δ*t*°C ±0.02	M % B
0.343	10.0
0.380	11.0
0.400	11.5

Br_2

B = S_2Br_2 (57)

Δ*t*°C ±0.05	M % B
1.125	0.5
2.250	1.0

Δ*t*° = 2.25 M % B.

B = PBr_5 (57)

Δ*t*°C ±0.005	M % B
0.215	0.5
0.357	1.0
0.400	1.5
0.475	2.0
0.645	3.0
0.75	4.0

B = $AsBr_3$ (57)

Δ*t*°C ±0.005	M % B
0.0266	0.5
0.533	1.0
0.800	1.5

Δ*t*° = 0.533 M % B.

B = $SbBr_3$ (57)

Δ*t*°C ±0.02	M % B
0.250	0.5
0.510	1.0
0.790	1.5
1.080	2.0
1.695	3.0
2.335	4.0
3.725	6.0
5.08	8.0

B = CCl_4 (57)

Δ*t*°C ±0.005	M % B
1.333	2.5

B = C_2H_5NO (57)
Acetamide

Δ*t*°C ±0.005*	M % B
0.080	1.0
0.120	2.0
0.140	3.0
0.156	4.0
0.180	5.0
0.236	6.0
0.323	7.0
0.448	8.0
0.605	9.0
0.83	10.0
1.17	11.0
1.63	12.0
2.25	13.0
2.63	13.5

* From 0–10 M % B.

B = $AlBr_3$ (57)

Δ*t*°C ±0.005	M % B
0.138	0.5
0.276	1.0
0.414	1.5

Δ*t*° = 0.276 M % B.

Br_2

B = HBr [144]

Δt°C ±0.01	M % A
0.20	0.15
0.33	0.25
0.64	0.50
0.765	0.60

I

B = S

Δt °C*	M % B [127]
0.30	1.00
0.55	2.00
1.20	5.00
1.74	7.50
2.30	10.00
3.64	15.00
0.18	1.50 †
0.30	2.00 †
0.52	3.00 †
0.76	4.00 †
0.17	2.00 ‡
0.39	3.00 ‡
0.61	4.00 ‡

* ±0.01.
† Precipitated [18].
‡ Plastic [18].

B = Se [18, 119, 123, 127]

Δt °C*	M % B
0.25	0.2
0.47	0.4
0.68	0.6
0.88	0.8
1.07	1.0
1.54	1.5
2.00	2.0
2.90	3.0
3.84	4.0
4.70	5.0
5.55	6.0
6.40	7.0
7.30	8.0
8.15	9.0
9.05	10.0
10.0	11.0

* ±0.02 (0.25 – 2.90°); ±0.05 (3.84 – 10.0°).

B = Te [18, 127]

Δt °C*	M % B
0.70	0.50
0.89m(?)	0.70
1.10m(?)	0.90
1.26m(?)	1.10

* ±0.02.

B = P [18]

Δt°C ±0.02	M % B
1.210	1.50

For <1.50 M % B, Δt° = 0.8067 M % B

I_2

B = NH_4I [127]

Δt°C ±0.05	M % B
0.64	1.0
1.20	2.0
1.86	3.0

B = NH_4I.—(*Continued*)

Δt°C ±0.05	M % B
2.65	4.0
3.57	5.0
4.75	6.0

B = AsI_3 or SbI_3 [126]

B = CHI_3 [126, 127]

Δt°C ±0.01	M % B
0.408	0.5
0.816	1.0
1.230	1.5
1.640	2.0
2.040	2.5

B = $C_3H_5IO_2$ [126, 127]
β-Iodopropionic acid

Δt°C ±0.01	M % B
0.300	0.5
0.540	1.0
0.745	1.5
0.930	2.0
1.105	2.5
1.285	3.0
1.605	4.0
1.880	5.0

B = $C_4H_{12}IN$ [126, 127]
Tetramethylammonium iodide

Δt°C ±0.01	M % B
0.08	0.1
0.185	0.25
0.355	0.5
0.655	1.0
0.980	1.5
1.360	2.0
1.835	2.5
2.355	3.0
3.615	4.0
4.45	4.5

B = $C_6H_4Br_2$ [126, 127]
p-Dibromobenzene

Δt°C ±0.03	M % B
0.408	0.5
0.800	1.0
1.185	1.5
1.555	2.0
1.915	2.5
2.26	3.0
2.91	4.0
3.51	5.0
4.07	6.0

B = $C_6H_4N_2O_4$ [126, 127]
p-Dinitrobenzene

Δt°C ±0.01	M % B
0.408	0.5
0.800	1.0
1.17	1.5

B = C_6H_6 [166]

Δt°C	M % A
0.178	0.350

B = C_6H_8IN [126, 127]
Aniline hydroiodide

Δt°C ±0.01	M % B
0.08	0.1
0.185	0.25
0.355	0.5
0.655	1.0
0.970	1.5
1.335	2.0
1.740	2.5
2.175	3.0
3.19	4.0
4.50	5.0

B = $C_7H_6O_2$ [126, 127]
Benzoic acid

0.315	0.5
0.525	1.0
0.695	1.5
0.845	2.0
0.985	2.5

B = $C_9H_{14}IN$ [126, 127]
Trimethylphenylammonium iodide

0.08	0.1
0.175	0.25
0 335	0.5
0.670	1.0
1.035	1.5
1.465	2.0
1.948	2.5
2.550	3.0
3.300	3.5
4.090	4.0
4.960	4.5
8.28	6.0
11.28	7.0

B = $C_{10}H_8$ [126, 127]
Naphthalene

0.408	0.5
0.800	1.0
1.185	1.5
1.555	2.0
1.910	2.5

B = $C_{10}H_{16}IN$ [126, 127]
Trimethyltoluylammonium iodide

0.08	0.1
0.175	0.25
0.335	0.5
0.670	1.0
1.035	1.5
1.470	2.0
1.950	2.5
2.7	3.0

B = $C_{12}H_{10}$ [52]
Diphenyl

Δt°C ±0.02	M % B
0.408	0.5
0.800	1.0
1.175	1.5
1.520	2.0
1.845	2.5
2.155	3.0
2.45	3.5

B = $C_{12}H_{10}N_2$ [126, 127]
Azobenzene

Δt°C ±0.02	M % B
0.408	0.5
0.800	1.0
1.185	1.5

B = $C_{14}H_8O_2$ [126, 127]
Phenanthraquinone

0.370	0.5
0.670	1.0
0.925	1.5
1.115	2.0
1.250	2.5

B = $C_{14}H_{10}O_3$ [126, 127]
Benzoic anhydride

Δt°C	M % B
0.390*	0.5
0.730†	1.0
1.025*	1.5
1.25*	2.0
1.36†	2.5
1.46†	3.0

* ±0.01. † ±0.05.

B = SnI_4 or HgI_2 [126]

B = KI [127]

Δt°C ±0.05	M % B
0.67	1.0
1.34	2.0
2.00	3.0
2.74	4.0
3.68	5.0
4.75	6.0
6.00	7.0

B = RbI [127]

0.67	1.0
1.34	2.0
2.00	3.0
2.90	4.0
4.05	5.0
5.30	6.0

S

B = I [18]

Δt°C ±0.01	M % B
0.758	0.2335

S_8

B = $SeCl_4$ [19]

Δt°C	M % B
0.63	0.520
0.51	0.468
0.52	0.476
0.67	0.413
0.49	0.511
0.46	0.525

B = As_2S_3 [19]

0.194	0.212
0.095	0.204
0.077	0.213
0.194	0.206
0.070	0.145
0.185	0.274
0.107	0.271

B = $CHBr_3$ [19]

0.90 ±0.1	1

S_8.—(*Continued*)

$B = C_5H_4O_2S$ (19)
Thiophenecarboxylic acid

Δt°C	M % B
0.49	1

$B = C_6H_7N$ (19)
Aniline

Δt°C	M % B
0.663	1

$B = C_7H_5NS$ (19)
Phenyl isothiocyanate

Δt°C	M % B
0.90	1

$B = C_7H_8O$ (19)
p-Cresol

Δt°C	M % B
0.747	1

$B = C_9H_7N$ (19)
Quinoline

Δt°C	M % B
0.84	1

$B = C_{10}H_8$ (19)
Naphthalene

Δt°C	M % B
0.84	1

$B = C_{10}H_8O$ (19)
β-Naphthol

Δt°C	M % B
0.813	1

$B = C_{10}H_{14}O$ (19)
Thymol

Δt°C	M % B
0.82	1

$B = C_{11}H_8O_2$ (19)
α-Naphthoic acid

Δt°C	M % B
0.533	1

$B = C_{12}H_{10}$ (19)
Diphenyl

Δt°C	M % B
0.84	1

P_4

$B = Se_8$ (14)

Δt°C*	M % B
0.166	0.05
0.332	0.10
0.500	0.15

$\Delta t \div$ M % B = 3.32.
* ±0.01.

$SbCl_5$

$B = Cl_2$ (115)

Δt°C ±0.05	M % B
1.22	2.0
2.38	4.0
3.62	6.0
5.00	8.0
5.83	9.0
6.35	9.5

$B = Br_2$ (115)

Δt°C	M % B
1.262	1.91
2.745	4.17
4.275	6.50

Δt° is a linear function of M % B to ±0.005°.
Δt° = 0.658 M % B.

$B = I_2$ (115)

Δt°C	M % B
0.602	0.347
1.650	0.962
2.215	1.296

$B = I_2$.—(*Continued*)
Δt° = 1.709 M % B to ±0.005.

$CHBr_3$

$B = I_2$ (166)

Δt°C ±0.02	M % B
0.275	0.5
0.550	1.0
0.827	1.5
1.105	2.0
1.380	2.5

Δt° = 0.552 M % B.

CH_2I_2

$B = I_2$ (16)

Δt°C	M % B
0.173	0.35

$C_{14}H_8O_2$

Anthraquinone
$B = S_8$(18)

Δt°C ±0.01	M % B
0.415	0.5
0.800	1.0
1.500	2.0
2.150	3.0
2.475	3.5

$B = Se_8$ (18)

Δt°C ±0.005	M % B
0.075	0.1
0.150	0.2
0.225	0.3

Δt° = 0.75 M % B.

$HgCl_2$

$B = S_8$ (122)

Δt°C ±0.005	M % B
0.320	0.25
0.645	0.50
0.955	0.75
1.245	1.00
1.530	1.27

$B = Se_8$ (122)

Δt°C	M % B
0.15*	0.05
0.27*	0.1
0.47*	0.2
0.645*	0.3
0.805*	0.4
0.88*	0.5
1.33†	0.75
1.66†	1.0
2.33‡	1.5
3.00‡	2.0

The mol. of Se in liq. B seems to be Se_2.
* ±0.02. † ±0.05. ‡ ±0.1.

$HgBr_2$

$B = S_8$ (125)

Δt°C ±0.005	M % B
0.55	0.5
1.11	1.0
1.65	1.5
2.16	2.0
2.66	2.5

$B = S_8$.—(*Continued*)

Δt°C ±0.005	M % B
3.14	3.0
3.50	3.5
4.01	4.0
4.40	4.5
4.93	5.3

$B = Se_8$ (125)

Δt°C	M % B
0.13*	0.05
0.22*	0.10
0.39†	0.20
0.70†	0.40
0.99†	0.60
1.265†	0.80
1.53†	1.0
2.66‡	2.0
3.84§	3.0
4.80§	4.0

The mol. of Se in liq. B seems to be Se_2.
* ±0.005. ‡ ±0.02.
† ±0.01. § ±0.05.

THREE-COMPONENT SYSTEMS

Bi

B = S (3, 4, 9, 14)
C = Te

See Fig. 5.
$E_1 = A + A_2C_3$.
$E_2 = A_2C_3 + A_4B_3C_3$.
$E_3 = A_2B_3 + A_4B_3C_3$.
$E_4 = A + A_2B_3$.

Ternary E (near 100 M % A) not determined.

For systems containing Fe, *v.* Vol. II, p. 449.

LITERATURE

(For a key to the periodicals see end of volume)

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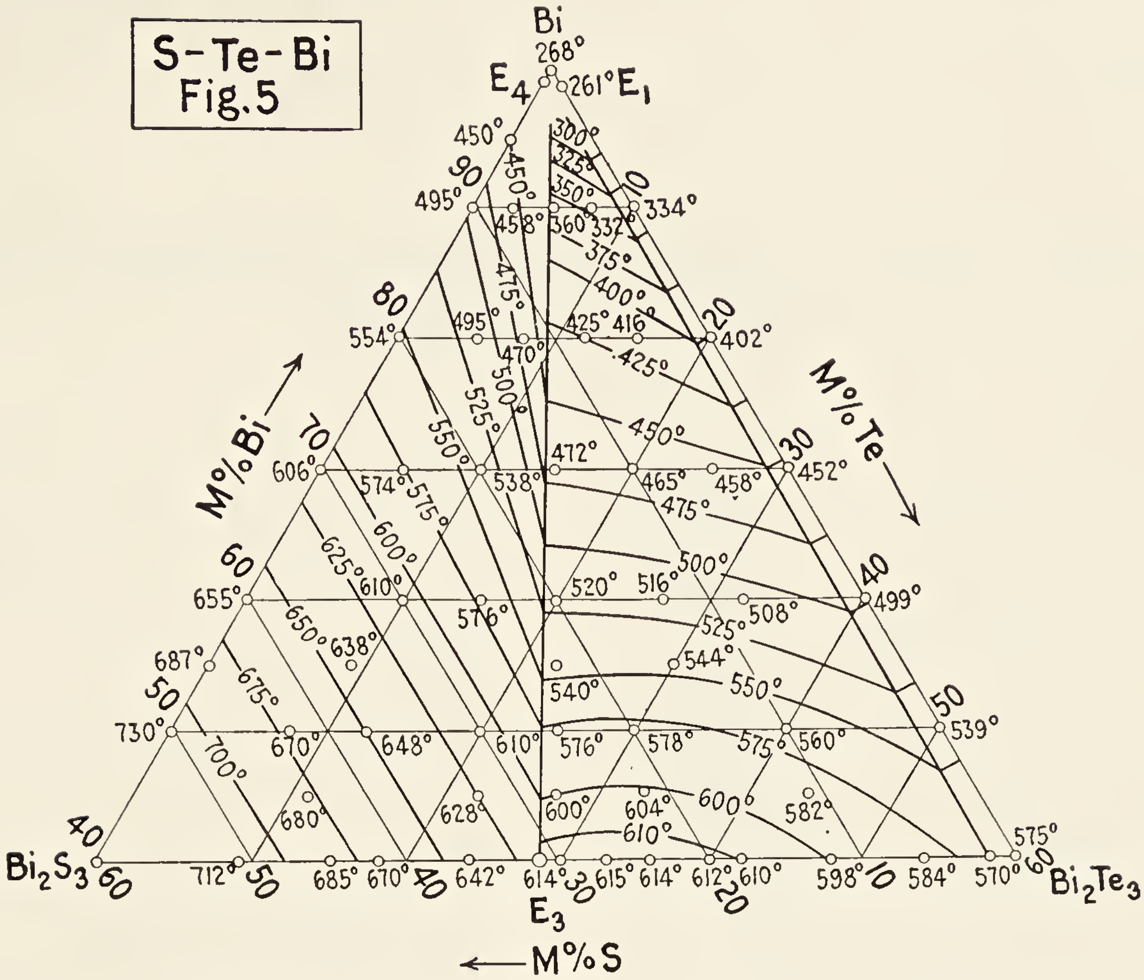

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FREEZING-POINT—SOLUBILITY DATA FOR SYSTEMS COMPOSED OF A METAL AND AN INORGANIC COMPOUND

Domenico Meneghini

Ca

B = CaF_2 (16, 17)
B = $CaCl_2$ (2, 17)
B = CaI_2 (8, 17)

Na

B = NaOH (4)
Solubility of Na in NaOH

t, °C	g A/100g B
480	33.3
500	10.1
610	9.9
670	9.5
760	7.9
800	6.9

K

B = KOH
g K dissolved by 100 g KOH = 8.0 at 480°: = 1.0 at 700° (4)

Cd

B = $CdCl_2$ (1)

t, °C	M % A
	?*
568	0.0
562	2.4
556	3.5
544	7.8
530	12.5
569	14.0
602	15.1
605	15.2
633	16.2
635	16.3

* The solid phase contains no $CdCl_2$.

Cu

B = Cu_2O (5)

t, °C	Wt. % B
Cu (?)	
1102	0.08
1095	1.16
1089	1.75
Cu + Cu_2O (?)	
1084	3.45
Cu_2O (?)	
1116	4.7
1149	6.3
1186	9.0

B = SO_2
0.0163 g-mole SO_2 in 100 g Cu lowers the M. P. 13.4°C. p_{SO_2} = 1 atm. (15)

Ag

B = H_2O
In 7 days 1.1 l of H_2O dissolved *ca.* 0.009 mg Ag at room temp. (6)

B = AgF
Ag(s) + AgF(s) = Ag_2F(s) + 700 cal_{15}. The reaction begins at 50° and the compound is stable at 90° (3, 17)

C (graphite)

B = Mn (11)
See Fig. 1

B = Co (13)
See Fig. 2
B = Ni (12)
See Fig. 3
B = W
See under W

Pb

B = SO_2 (9)

B = $PbCl_2$ (7)

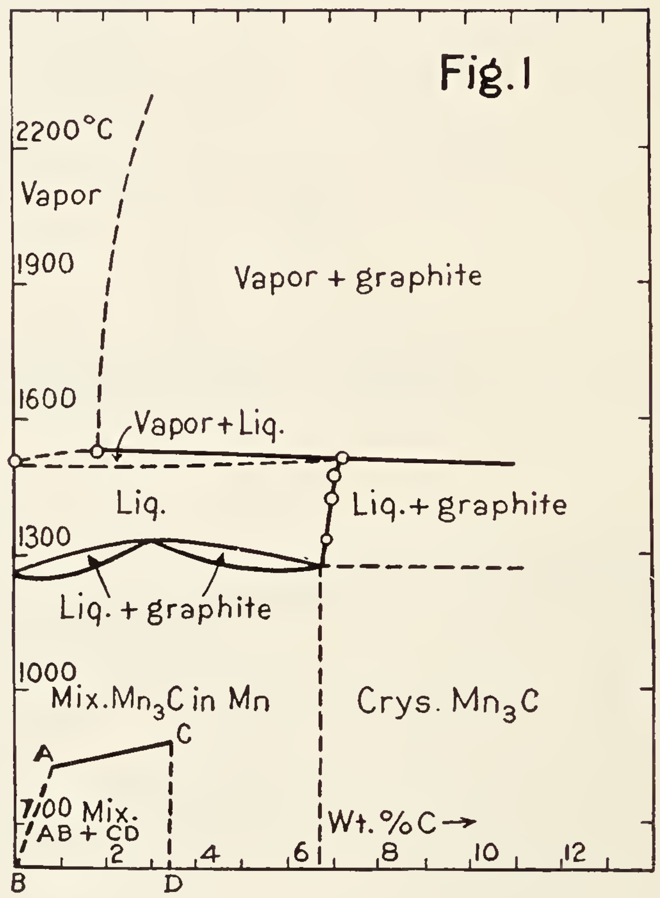
t, °C	Wt. % A (?)
550	1.54
610	3.74
615	4.10
670	7.46

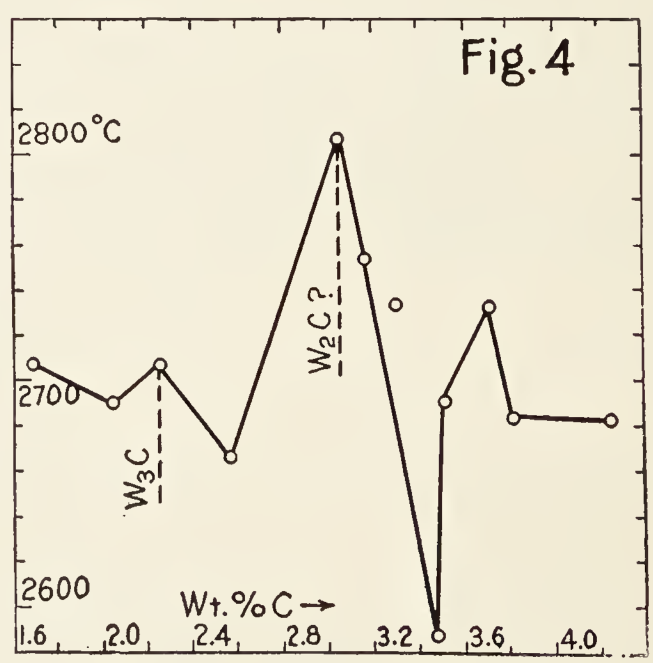
Ni

B = NiO (10)

W

B = W_3C (14)
For 1% C in W the M. P. is lowered *ca.* 35°. The following carbides have been demonstrated: W_3C with 2.12% C, (W_2C with 3.16% C), WC with 6.12% C. The observed eutectics are W + W_3C at 1.3% C and 2690°; at 2.4% C and 2660° formed from W_3C, WC and W_2C (?); and WC + W_2C at 3.5% C and 2580°. *See* Fig. 4





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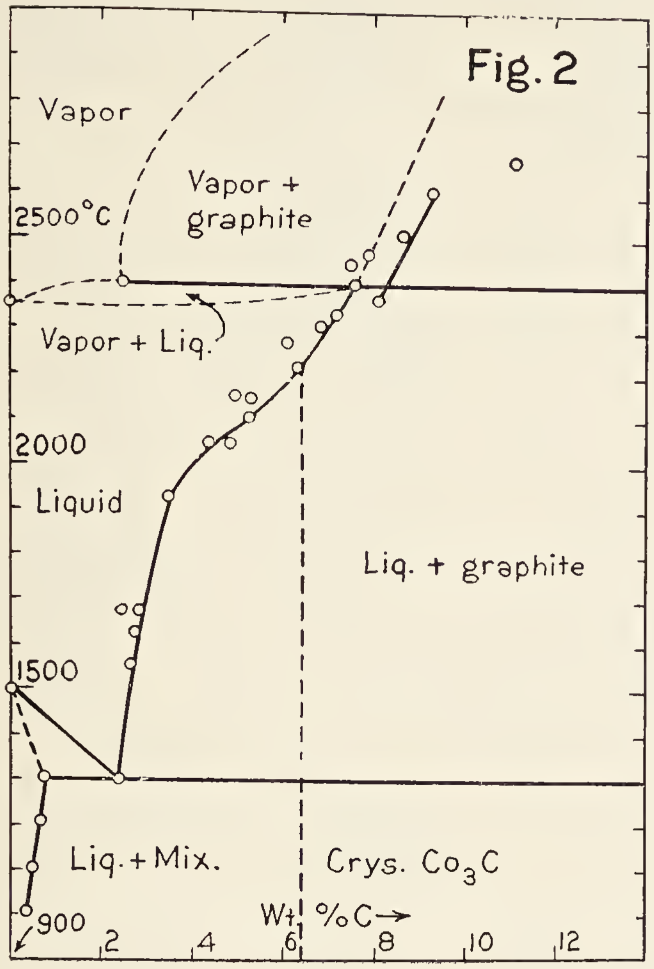

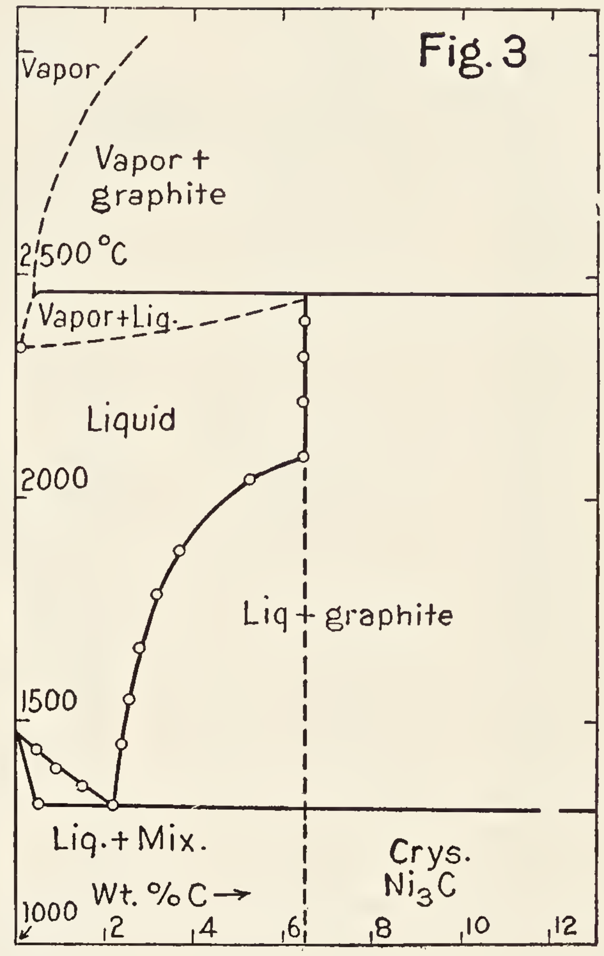

FREEZING-POINT—SOLUBILITY DATA FOR TWO- AND THREE-COMPONENT NON-AQUEOUS SYSTEMS COMPOSED OF INORGANIC COMPOUNDS ONLY AND INCLUDING ALL SYSTEMS COMPOSED OF FUSED SALTS*

Carlo Sandonnini, Umberto Sborgi and Mario Amadori†

Abbreviations and Symbols; *v. also* p. 4

Compositions on ternary-system diagrams are in Mol % unless otherwise stated.

k_A (resp. k_B) = $\Delta t/N$ where Δt is the freezing point lowering and N the number of moles of solute B (resp. A) dissolved in 1000 g of the solvent A (resp. B) for values of N up to the value given in the parentheses.

M. c. t. Melted in closed tube.

The pressure is atmospheric unless otherwise indicated.

Abbréviations et Symboles; *v. aussi* p. 4

Dans les diagrammes des systèmes ternaires, les compositions sont exprimées en % Mol à moins d'une autre indication.

k_A (resp. k_B) = $\Delta t/N$, où Δt est l'abaissement du point de congélation et N le nombre de mol. gr. du corps dissout B (resp. A) dans 1000 g de solvant A (resp. B) pour des valeurs de N jusqu'à celle donnée entre parenthèses.

M. c. t. Fondu en tube fermé.

Pression atmosphérique à moins d'une autre indication.

Abkürzungen und Zeichen; *siehe auch* S. 4

In den Diagramen ternärer Systeme ist, wenn nichts anderes bemerkt, die Zusammensetzung in Mol % angegeben.

k_A (bezw. k_B) = $\Delta t/N$, ist Δt die Gefrierpunkterniedrigung und N die Molenzahl des gelösten Stoffes B (bezw. A) gelöst in 1000 g des Lösungsmittels A (bezw. B) für Werte von N bis zu dem in der Klammer angegebenen Wert.

M. c. t. Geschmolzen in geschlossenen Röhre.

Druck immer atmosphärischer wenn nicht anderes bemerkt.

Abbreviazioni e Simboli; *vedi anche* p. 4

Le composizioni nei diagrammi ternari sono in Mol % quando non è indicato diversamente.

k_A (risp. k_B) = $\Delta t/N$ dove Δt è l'abbassamento del punto di congelamento ed N il numero di moli di soluto B (oppure A) disciolto in 1000 g di solvente A (o B) per valori di N fino al valore indicato fra parentesi.

M. c. t. Fuso in tubo chiuso.

Pressione atmosferica si non è indicato diversamente.

* Except systems composed of (*a*) two or three refractory substances or (*b*) of one or two refractory substances together with any metallic oxide. For such high temperature systems, *see* p. 83.

† Systems marked (S.) are by Umberto Sborgi, those marked (A.) by Mario Amadori, all others by Carlo Sandonnini.

CONTENTS

1. TWO-COMPONENT SYSTEMS

Standard Arrangement (*v.* Vol. III, p. viii)

H_2O_2

B = NH_3 (153) (S.)

t, °C	Wt. % B
A	
− **1.72**	0
−13	3.41
−18	4.31
A + AB	
(−44)	(6)
AB	
+ 5	18.05
15	21.1
22	25.2
(25)	27.7
(25)*	33.34
+ 9	48.6
0	50.7
− 9.5	52.8
−32	56.7
−53.5	59.5
<−78	61.3

* The authors give 24.5°.

B = NaCl (153) (S.)

A	
− **1.70**	0
− 5.07	5.42
− 7.65	8.61
−10.57	11.81
A + B	
(−13.5)E	(15.5)
B	
−10.37	15.63
>0	17

B = Na_2SO_4 (153) (S.)

A	
− **1.70**	0
− 4.27	6.92
− 5.52	10.23
− 9.02	16.77
A + BA_2	
−10.80E	20.46
BA_2	
+19.6	22.64
29.1	23.59
39.1	25.62

B = $NaNO_3$ (153) (S.)

A	
−**1.70**	0
−3.72	5.11
−5.62	10.11
−8.12	16.66
−9.52	20.19

B = $NaNO_3$.—(*Continued*)

t, °C	Wt. % B
A + B	
(−11)E	(23)
B	
+11.8	25.22
32.3	28.25
49.3	31.53

HCl

B = SO_2 (26) (S.)

t, °C	M % A
B	
− **72**	0
− 76.5	8.9
− 83.4	19.7
− 88.1	28.2
− 95.5	39.9
−101.3	49.3
−111.2	59.4
−121.8	69.4
B + A	
−133.4E	79.3
A	
−127.5	85.3
−121.4	91.7
−**112.0**	100

B = H_2S (25) (S.)

Mix.	
− **82.6**	0
− 92.3	13.7
−100.9	24
−107.9	32.6
−110.4	39.2
−111.4	44.9
−114.7	55.2
−115.3	57.6
−115.6	61.0
−116.3	63.7
−117.2	67.8
−117.4	71.3
−117.3	76.2
−116.9	80.7
−116.3	86.6
−115.7	91.5
−**111.6**	100

HBr

B = H_2S (22) (S.)

Mix.	
−**82**	0
−83.5	10.7
−85	18.2
−86	25.0
−86.7	31.0
−87.0	35.7
−87.0	39.8
−87.0	44.2
−87.0	49.0
−87.5	51.5

B = H_2S.—(*Continued*)

t, °C	M % A
Mix.	
−87.3	55.0
−87.2	58.5
−86.9	64.4
−86.2	71.2
−85.3	82.4
−**83.1**	100

HI

B = H_2S (22) (S.)

Mix.	
−**82.0**	0
−87.0	11.3
−89.0	20.3
−90.8	28.4
−90.7	35.6
−89.0	41.0
−87.0	51.0
−83.0 ↓	56.0
−**46**	100

ICl

B = $SbCl_5$

v. A = $SbCl_5$

IClα

B = CCl_4 (175) (S.)

M. P. of A = 27.16°

k_A = 10.5

SO_2

B = SO_2Cl_2 (92) (S.)

t, °C	M % B
A	
−**75.1**	0
−77.4	5.5
−81.5	18.4
A + B	
−84.5E	28.5
B	
−83.7	33
−76.4	48.3
−74.3	53.4
−69.5	64.8
−64.4	77.3
−57.4	93.1
−**54.1**	100

B = CO_2 (251) (S.); *v.* Fig. 1

P = 750 mm

B	
	No liq.
−78.61	99.72*
−78.643	33.6†
<−78.643	<33.6
Liq.	
−10.09	0

* % in gas, p_A = 2.1 mm.
† % in soln.

B = $TiCl_4$ (281)

B = $SnCl_4$ (38); *cf.* (281) (S.)

t, °C	Wt. % B	
B		
−72.7	5.4	
−63.0	11.78	
−49.8	26.29	
−44.8	44.27	
−44.1	55.24	
−43.8	67.47	
−43.25	82.41	
−40.6	92.66	
−**32.7**	100	
Two metastable liq. layers		
−57.5	31.96	
−52.0		86.16
−46.3	50.76	
−45.4		75.76
−44.9*	(71)	(71)

* Critical soln. temp.

B = $SnBr_4$ (38); *cf.* (281) (S.)

B		
−53.05	0.39	
− 5.0	5.37	
+ 5.45	10.61	
16.3*	21.67	
Two liq. layers		
−17.8m	11.88	
+ 1.8m	14.08	
16.3*	21.67	
16.55*		94.07
25.00	26.09	
28.70		91.65
39.75	40.63	
42.60		85.54
46.30	52.83	
47.25		80.31
48.6†	(71)	(71)
B		
18.80	96.24	
24.90	98.74	
29.45	100	

* Quadruple point.
† Critical soln. temp.

B = SnI_4 (281)

B = KI (268) (S.)

v. Fig. 2

t, °C	M % B
A	
−**72.7**	0
A + $A_{14}B$	
−73E	0.336
$A_{14}B$	
−54.7	1.785
−37.3	4.130
(−**23**)	7.00
$A_{14}B$ + A_4B	
−28.4E	8.48

B = KI.—(*Continued*)

t, °C	M % B
A_4B	
−19.2	11.60
− 2.5	17.93
+ **0.26**	20
A_4B + B	
−1.8E	21.5
B	
+75.3	15.66
84.2	11.28
88.1	10*
88.1	1.72*
96.4	0.58

* Two liq. layers with following composition:

t, °C	Wt. % B Upper	Wt. % B Lower
88	2.7	24.0
86	3.8	22.5
84	4.5	21.1
82	5.1	19.8
80	6.8	17.6
78	8.5	15
77.3	12	

For qualitative data on solubility of several salts at temperatures up to the critical temperature, *v.* (82).

H_2S

B = BF_3 (88) (S.)

t, °C	M % A
B	
−**128.5**	0
−139	11
B + BA	
−148E	22
BA	
−142	30
−138	40
−**137**	50
BA + BA_7	
−140E	53
BA_7	
−126	60
−104	80
BA_7 + A	
− 99U	87.5
A	
− 92.5	90
− **82**	100

B = CO_2 (251) (S.)

v. Fig. 3

P = 750 mm

t, °C	M % B
B	
−78.61	No liq.
−82.06	75.3* in gas, 25.4 in soln.
<−82.06	<25.4
Liq.	
−62	0

* p_A = 184 mm.

$S_2O_5Cl_2$

B = SO_3HCl (232) (S.)

t, °C	Wt. % B
(?)	
−**37** to −**37.5**	0
−36 to −41	1
−37 to −42	5
−38 to −41	9
−39 to −43	18
−39 to −45	30
−43 to −47	48
−47 to −50	63
−61 to −66	89
−**80** to −**81**	100

$SeOCl_2$ (271) (S.)

t = 25°C

S. P. = solid phase

% = Wt. % in solution

Solute (B)	%	S. P.
LiCl	3.21	B
NaCl	0.57	B
KCl	2.89	AB
RbCl	3.56	AB
CsCl	3.83	?
$CuCl_2$	<0.10	B
AgCl	<0.10	B
$MgCl_2$	4.96	A_3B (?)
$CaCl_2$	6.11	A_3B (?)
$SrCl_2$	5.17	B
$BaCl_2$	3.95†	B
$InCl_2$	1.10	B
$CdCl_2$	0.15	B
$HgCl_2$	0.89	B
$TiCl_4$	0.75	A_2B
$SnCl_4$	13.73	A_2B
$PbCl_2$	<0.10	B
$AsCl_3$	*	
$SbCl_5$	38.64	A_2B
$CrCl_3$	<0.10	B
$MnCl_2$	0.16	(?)
$FeCl_3$	23.40	A_2B
$NiCl_2$	0.15	B
$CoCl_2$	0.17	B

* Miscible in all proportions.
† 2.35 at 40°; 1.23 at 55°; 0.71 at 70°.

H_2SO_4

B = $(NH_4)_2SO_4$ (58, 133) (A.)

t, °C	M % B
A	
10.4	0
6.2	1.69
+ 1.3	3.47
− 5.0	5.39
−16.3	8.36
−20.7	9.41
−26.7m	10.48

B = $(NH_4)_2SO_4$.— *(Continued)*

t, °C	M % B
A_3B	
−20.7	9.41
−13.1	10.10
− 3.9	11.48
+ 5.3	12.36
17.6	14.33
26.7	16.21
42.7	20.67
46.9	23.12
48.0	25.00
45.8	27.88
39.8	30.41
AB	
− 2.6m	27.98
+ 4.8m	28.60
16.0m	29.62
22.0m	30.41
26.1m	30.87
32.9	31.21
39.4	31.63
53.5	32.65
79.8	35.06
97.4	37.31
M. c. t.	
109.5	39.13
120.8	40.67
126.4	42.47
136.8	45.18
142.6	47.60
144.9	48.08
146.9	50.00
144.1	51.84
141.7	53.08
137.2	54.27
AB_2 (?)	
147.2	55.05
151.7	55.43
176.7	57.18
187.7	57.98
210.2	59.78
229.2	61.64
232.0	62.38
AB_x	
269.2	63.45
281.5	63.98
318.0	67.37

B = HNO_3 (113) (S.)

t, °C	Wt. % B*
A	
+10	0
− 2.2	3.05
−18.2	5.38
A_5B (?)	
−15.1	7.83
− 0.7	10.20
+ **2.3**	10.80
+ 1.0	13.76
− 5.1	19.70
− 19.0	29.24
(−40)	39.40

B = HNO_3.— *(Continued)*

t, °C	Wt. % B*
A_5B (?)	
(−50)	48.84

* From 0–0.7% H_2O and 0.2–2% $HNOSO_4$ were also present.

B = SO_3, SO_2Cl_2, SeO_2, HNO_3, NO_2-$OHSO_2$, HPO_2, H_3-PO_3, H_3PO_4, $POCl_3$, B_2O_3 (102, 103, 104, 105, 106, 177, 178, 179, 180) (S.)

M. P. of A = 10.44°

k_A = 6.9

B = $PbSO_4$ (132) (A.)

1.23 M % B is sol. in A at room temp. but 1.27 M % is not all dissolved at B. P.

B = $ZnSO_4$ (132) (A.)

t, °C	M % B
A	
10.4	0
A_xB	
28.4	0.20
40.1	0.32
46.4	0.41
B (?)	
66.4	0.41
78.0	0.45
94.8	0.52
128.6	0.67

B = $HgSO_4$ (132) (A.)

A	
10.4	0
B (?)	
36.0	0.023
77.0	0.048
127.0	0.094

B = Hg_2SO_4 (132) (A.)

A	
10.4	0
AB	
20.0	0.68
27.0	0.82
34.9	1.02
47.7	1.41
56.8	1.77
63.3	2.17

Mixtures >1.7 M % decompose on heating.

B = $CuSO_4$ (132) (A.)

A	
10.4	0

B = $CuSO_4$.— *(Continued)*

t, °C	M % B
B (?)	
37.0	0.10
69.0	0.18
93.0	0.28
*	0.52

* Not soluble.

B = Ag_2SO_4 (132) (A.)

A	
10.4	0
6.1	1.99
2.4	3.67
A_2B	
1.5	5.69
13.0	7.41
29.9	10.17
35.3	11.80

AB(α)(β)*

t, °C (α)	*t*, °C (β)	M % B
40.2		12.38
43.1		12.88
50.4		13.63
	46.1	13.88
	51.7	14.64
59.3		15.62
	62.3	16.76
65.3	65.3	17.43
	70.1	18.71
	78.6	21.00
	86.7	23.96
	96.0	28.55
	105.1	33.74
	112.8	38.56
	120.0	44.69

B(M. c. t.)

t, °C	M % B
138.9	47.17
165.3	47.75
187.2	48.44
197.3	48.69

* (α) form is stable below 66°, (β) above 66°, with transformation at 122.5° to A + B.

B = $FeSO_4$ (132) (A.)

A	
10.4	0
A_xB	
30.2	0.22
42.3	0.31
48.6	0.40
57.7	0 51
63.8	0.63

Mixtures > 0.5 M % decompose on heating.

B = $Fe_2(SO_4)_3$ (132) (A.)

<0.015 M % B dissolves in A at B. P.

B = $NiSO_4$ (132) (A.)

0.25 M % B is sol. in A at room temp. but 0.29 M % is not all dissolved at B. P.

B = $MgSO_4$ (132) (A.)

t, °C	M % B
A	
10.4	0
A_3B	
25.7	0.18
44.2	0.32
66.0	0.62
72.3	0.77
82.8	1.07
91.7	1.37
*	1.53

* Not soluble at B. P.

B = $CaSO_4$ (132) (A.)

A	
10.4	0
9.1	0.98
7.2	1.99
4.7	3.17
2.2	4.00

A_3B(α)(β)

t, °C (α)*	*t*, °C (β)	M % B
3.4		4.45
10.1		4.70
13.5	19.1	4.84
18.4		5.19
22.2	28.4	5.31
28.4		5.74
31.5	36.9	5.92
39.7	45.4	6.63
45.4	51.3	7.11
49.4	55.1	7.59
†	60.3	8.34
†	62.2	8.66
†	†	9.06

* Unstable form.
† Not soluble. Mixtures >8% decompose on heating.

B = $BaSO_4$ (132) (A.)

t, °C	M % B
A	
10.4	0
9.1	0.95
6.6	2.12
+2.8	3.50
−3.2	5.46
−7.3	6.70
AB	
+5.7	6.70
12.4	7.30
20.0	8.09
23.0	8.59
	8.62*

* Not soluble. Mixtures >7 M % decompose on heating.

B = Li_2SO_4 (133) (A.)

t, °C	M % B
A	
10.3	0
8.0	0.81
+2.0	2.85
−3.6	4.63
A_7B	
+3.0	6.42
6.5	7.63
9.7	8.75
12.9	11.24
13.1	12.33
13.3	12.50
13.0	13.50
A_2B	
17.9	13.64
32.6	14.91
36.7	15.31
44.3	16.23
48.9	16.58
AB	
55.3	17.01
70.9	18.39
82.7	19.32
91.2	20.06
M. c. t.	
105.2	22.11
114.7	23.92
125.4	26.41
135.8	28.95
144.5	32.30
152.4	35.12
159.4	38.33
161.5	40.76
168.5	46.00
AB_x	
186.5	47.60
229.9	48.10
256.0	48.55
279.9	49.85
289.0	50.48
315.0	51.60

B = Na_2SO_4 (58, 133, 191) (A.)

A	
10.4	0
4.3	1.92
A_7B_2	
10.8	3.69
21.2	4.79
36.8	7.04
45.4	8.91
55.0	12.63
57.4	15.11

A_2B(α)(β)

t, °C (α)*	*t*, °C (β)	M % B
62.9	71.5	16.29
70.4	78.6	17.48
79.7	88.5	19.21
87.0	95.7	20.95
93.6	102.1	23.14

t, °C	M % B
AB (M. c. t.)	
112.5	25 36

B = Na_2SO_4.— *(Continued)*

t, °C	M % B
AB (M. c. t.)	
122.3	26.37
136.5	28.90
148.2	30.43
159.0	33.99
170.0	37.27
180.7	43.41
185.5	48.25
186.0	50.00
185.8	50.23
AB_x	
190.9	50.97
194.3	51.37
223.3	53.96
254.2	56.72
274.5	58.83

* Unstable form.

B = K_2SO_4 (58, 133) (A.)

A	
10.4	0
7.2	1.0
+ 3.4	2.37
− 3.2	4.23
− 7.9	5.51
A_3B	
− 0.8	6.87
+15.4	8.34
36.5	10.40
59.1	13.53
77.1	17.21
83.3	19.03
89.2	21.80
91.5	24.05
91.6	25.00
89.0	28.27
AB (M. c. t.)	
105.4	29.29
122.1	30.93
136.7	32.49
162.0	35.97
178.3	39.22
200.2	43.31
210.0	46.77
215.7	48.62
218.6	50.00
214.1	51.70
212.4	53.20
AB_x	
219.8	53.58
235.8	54.72
237.5	55.24
AB_y	
264.3	55.71
296.8	56.59
300.0	58.47

NO

B = NO_2 (272) (S.)

t, °C	Wt. % B
AB	
(**−103**)*	60.53
−104.5	61.3
−108.5	63.6

NO.—(*Cont'd*)

B = NO_2.—(*Cont'd*)

t, °C	Wt. % B
AB + B_2	
−112.5E	65.4
B_2	
− 73.0	71.0
− 37.7	80.0
− 31.7	82.9
− 18.0	91.2
− 10.0	99.9

* At *ca.* 103° and P = 42 atm. two liq. layers form.

NO_2

B = N_2O_3

(212) (S.)

M. P. of A = −10.14°

k_A = 3.9

N_2O_3

B = N_2O_4 (27) (S.)

t, °C	Wt. % A
B	
− 11.5	0
− 15.6	10.9
− 20.5	20.2
− 26	30.4
− 34	42.9
− 41.5	51.9
− 50	59.7
− 75	73.4
− 92	80.1
B + A	
−107E	86.3
A	
−100	97

N_2O_4

B = HNO_3

(40, 192) (S.)

t, °C	Wt. % B
A	
−10.2	0
−11.8	3*
−11.8	52*
−21.4	60
−32	62
A + AB_2	
−48.5U	66
AB_2	
−58.5	70
AB_2 + B	
−73E	82
B	
−70.0	85
−58.5	90.6
−42.0	100

* Two liquid phases with following composition:

t, °C	Wt. % B	
−11	52	3
− 5		4.20
− 0 8	50	
+ 5		5.20

B = HNO_3.—(*Continued*)

t, °C	Wt. % B	
15	45	
19.5		7.15
20	44.3	
35	37.5	
40		10
50	30	
55		20
(56)	22.5	

B = CCl_4

(190) (S.)

t_L, °C	t_S, °C	Wt. % A
	Mix.	
−23.5	−23.5	0
−31.5	−36.5	1.8
−38.5	−43.5	4
−49E	−49E	8.15*
−43.5	−49	15
−34.5	−49	29.5
−20.5	−49	60
−17	−31	70
−14	−22	77.5
−11	−13	90
−10.2	−10.2	100

* Wt. % A = 62 % in mixed crystal at E.

NH_3

B = NH_4NO_3

(141) (S.)

t, °C	M % B
A	
(−80)	0
A + A_3B	
(−80)E	(1)
A_3B	
−60	6.25
−44.5	13.9
A_3B + B	
(−40)E	(30)
B	
−30.0	32.3
−10.5	36.9
0	38.3
+33.3	45.9
35.9	47.0
68.8	53.8
94.0	67.3
109.8	74.2
168	100

B = NH_4F

(131) (S.)

B is practically insol. in liq. A.

B = NH_4Cl

(131) (S.)

t, °C	M % A
B	
31.0	71.5
9.1	72.3
B + BA_3	
(9)E	(73)
BA_3	
10	74
10.7	75
+ 3.2	81.9
−10	87.9
−19.6	91.3

B = NH_4Cl.—(*Continued*)

t, °C	M % A
BA_3	
−35.0	95.5
−67.4	98.8
BA_3 + A	
(−75)E	(99)
A	
−74.8	100

B = NH_4Br

(131) (S.)

t, °C	M % A
B	
87	68.6
32.6	70.7
9.2	71.8
B + BA_3	
(9)E	(72)
BA_3	
9.7	72.2
11.7	73.1
13.7	75.0
+ 0.4	81.3
−23.1	85.9
−57.4	89.5
BA_3 + A	
(−77)E	(91)
A	
−76.7	92.9
−76.0	95.6
−74.8	100

B = NH_4Br

(23) (S.)

v. Fig. 4

t, °C	M % A	P_{mm}
AB		
25	71.0	1590
20	71.4	1350
15	71.8	1132
10	72.2	942
+ 5m	72.5	780
0m	72.8	635
− 5m	73.2	512
−10m	73.4	405
AB + A_3B		
6.5E	72.45	815
A_3B		
6.9	72.6	
7.3	73.0	
7.7	73.3	
8.0	73.7	
8.4	74.4	
8.6	74.7	
8.7	75.0	1140
8.5	75.9	
8.1	76.5	
7.6	77.2	
AB + A_3B		
−21		162
−18		185
−15		227
−10		313
− 5		427
0		577
+ 3		688
5		770

B = NH_4I

(131) (S.)

t, °C	M % A
B	
57	66.8
+22.6	69.8
− 7	72.4
B + BA_3	
(−12)E	(72.5)
BA_3	
−11.5	73.2
− 8.9	74.3
− 8.0	75
− 9.1	75.9
BA_3 + BA_4	
−10.9E	77.0
BA_4	
− 9.2	77.9
− 5.1	80
−16.0	84.0
−46.2	88.8
−79.5	92.8
BA_4 + A	
(−81)E	(93)
A	
−78.6	95.4
−74.8	100

B = NH_4CNS

(41, 77) (S.)

t, °C	Wt. % A
B	
14.8	0
49.8 ↓	16.67
2.8 ↓	23.13
77	9.8
+56 ↓	13.22
−13.8 ↓	22.50
B + BA	
−20E	23.94
BA	
−(16)m	18.09
−24.3	25.61
−34.8	29.13
BA + BA_3	
−(43)E	(30)
BA_3	
−38.8	36.38
−(38)	40.17
−44	45.40
BA_3 + BA_6	
−(81)E	56.50
BA_6	
−(76)	57.31
BA_6 + B_2A_{13} (?)	
−(81)E	(58)
B_2A_{13} (?)	
−79.8	59.26
B_2A_{13} (?) + BA_7 (?)	
−84.7E	60.73
BA_7 (?)	
−(84)	61.03
BA_7(?) + BA_8	
−87.2E	(63)
BA_8	
−(87)	64.16
−90.8	66.40

B = NH_4CNS.—(*Continued*)

t, °C	Wt. % A
BA_8 + A	
−(96)E	(67)
A	
−85.7	71.00
−81.3	76.18
−78.7	83.18
−77	90.01
−76.2	100

B = NaOH

(206) (S.)

4 mg NaOH dissolves in 1000 g NH_3 at *ca.* −40°C. For qualitative data on solubility of several salts at temperatures up to the critical temperature, *v.* (82).

N_2H_4

Hydrazine

For behavior towards aqueous solutions of various inorganic compounds, *v.* (269).

NH_4NO_3

B = $(NH_4)_2SO_4$

(199) (A.)

t, °C	M % B
Mix (A + B)	
169.4	0
171.5	0.56
173.6	1.28
177.7	2.84
180.6	5.12
180.8	7.36
180.8	8.90

B = $Pb(NO_3)_2$

(36) (A.)

A	
158.0	0
150.5	4.77
144.0	6.82
136.5	9.09
A + (?)	
131.5E*	10.77
(?)	
142.0	12.11
164.0	15.60
180.0	16.98
202.0	19.68
226.0	23.05

* E between 9–17 M % B.

B = $TlNO_3$ (37)

v. Fig. 5

B = $AgNO_3$ (276)

t, °C	M % A
B(α)	
167.8	0
142	10
B(α) + B(β)	
125	16.5
B(β)	
120	20
B(β) + AB	
101E	30
AB	
108	40
109	50
AB + A(β)	
109	52
A(β)	
128	60
140	70
A(α) + A(β)	
159	76
A(α)	
160	80
190	90
209	100
Solid state	
B(β) B(γ)	
85	0–50
B(γ) B(δ)	
35	0–50

B = $LiNO_3$

(198) (A.)

t, °C	M % B
A	
169.5	0
153.9	5.74
135.6	11.40
121.1	16.98
108.1	22.47
A + B	
97.0E	27.87
B	
110.0	33.19
137.0	43.59
155.5	48.67
265.0	100.00

B = NaCl*

(196) (A.)

(?)	
169.5	0
157.9	2.70
146.4	5.39
129.7	9.33
NH_4NO_3 + NH_4Cl	
123.6E	10.61
NH_4Cl	
129.9	13.19
137.1	15.72
NaCl	
153.6	18.80
172.2	20.67

* Reciprocal salt mixtures.

B = $NaNO_3$ (68) (A.)

t, °C	M % B
A	
196.6	0
156.5	4.77
144.2	9.57
132.0	14.40
124.3	17.78
A + B	
120.8E*	19.73
B	
124.8	21.19
129.1	22.64
147.0	29.00
174.2	38.85

* E between 14.4–40 M % B.

B = KCl† (200) (A.)

t, °C	M % B
A	
169.6	0
162.7	2.50
155.9	4.73
146.6	8.52
NH_4NO_3 + KNO_3 Mix.	
138.8	11.18
137.0	13.14
NH_4Cl	
140.0	13.97
152.2	15.00
168.0	16.00

Mixtures of 12–15 M % gives E at *ca.* 137.5°.

B = K_2SO_4† (199) (A.)
Mix. (NH_4NO_3 + $(NH_4)_2SO_4$)

t, °C	M % B
169.5	0
171.7	1.70
173.4	1.92
175.3	4.59
176.2	5.83

B = KNO_3 (199, 200) (A.)

t, °C	M % B
A	
169.5	0
166.0	3.18
162.8	6.43
159.5	8.73
A + Mix. (A + B)	
157.2E	11.07
Mix. (A + B)	
160.1	13.08
165.9	14.96
171.8	17.28

† Reciprocal salt mixtures.

NH_4Cl

B = NH_4Br (213) (A.)
M. c. t.

t_{M_1}, °C*	t_{M_2}, °C*	M % B
Mix.		
520†	**520**†	0
517	518	15
514	515	25
511	512	35
518	521	50
536	537	85
542	**542**	100

* t_{M_1} = beginning, t_{M_2} = end, of fusion.
† In closed tubes.

B = NH_4NO_3 (196, 198, 200) (A.)

t, °C	M % A
B	
169.5	0
164.9	2.80
161.5	4.42
155.2	8.70
150.2	11.65
146.0	14.25
143.2	15.60
B + A	
140.9E	17.08
A	
146.5	18.27
155.6	19.58
170.6	20.0

Mixtures with 15.6-20 M % A give E near 141°.

B = $SbCl_3$ (130) (A.)
M. c. t.

t, °C	M % A
B(α)	
73.4	0
71.3	2.1
69.7	4.4
67.5m	7.5
66.5m	8.2
B(β)	
68.2	7.3
68.0	7.5
66.6	8.9
65.7	9.9
B(γ)	
64.4	12.5
63.1	14.1
59.5	18.1
BA	
70.0	19.8
89.2	22.9
104.1	25.5
123.1	31.3
134.8	34.7
139.7	36.2

B = $SbCl_3$.—(*Continued*)

t, °C	M % A
B_2A_3	
157.4	37.2
217.8	42.2
253.5	47.4
284.3	55.3
290.5	58.9
291.0	60.0
289.5	61.7
A	
289.5	63.5
296.8	64.6
318.0	68.7
338.0	72.2
392.0	81.3
418.0	85.9

B = $ZnCl_2$ (101)
v. Fig. 6

B = $CdCl_2$ (101)
v. Fig. 7

B = $HgCl_2$ (30) (A.)

t, °C	M % A
B	
265.0	0
263.8	0.90
263.3	1.25
262.9	1.69

k_B = 35.0(0.06).

B = CuCl (101)
v. Fig. 8

B = $FeCl_3$ (101)
v. Fig. 9

B = $AlCl_3$ (130) (A.)
M. c. t.

t, °C	M % A
B	
190.2	0
B_xA	
192.5	0.2*
192.5	20.5
186.6	23.8
171.8	28.5
157.9	31.9
BA	
173.4	33.2
229.4	36.9
239.7	38.2
274.1	43.5
301.2	49.1
304.0	50.0
287.2	53.1
266 1	56.8
257.1	58.4
A	
284.3	61.0
357.0	65.0

* Two liquid layers from 0.2 to 20.5.

B = LiCl (101)
v. Fig. 10

B = NaCl (213) (A.)
M. c. t.

t, °C	M % B
A	
520	0
A + (?)	
520E	(?)

B = KCl (213) (A.)
M. c. t.

t_{M_1}, °C*	t_{M_2}, °C*	M % B
Mix.		
520	**520**	0
552	556	5
561	570	10
571	576	15
576	590	20
592	610	25
602	643	30

* t_{M_1} = beginning, t_{M_2} = end, of melting.

NH_4Br

B = $HgBr_2$ (98) (A.)

t, °C	M % A
B	
235.0	0
232.7	2.38
230.6	4.42
228.1	6.71

k_B = 34.3(0.18).

B = $AlBr_3$ (130) (A.)
M. c. t.

t, °C	M % A
B	
97.1	0
B_xA	
98.0	0.5*
98.0	20.8
94.8m	24.0
B_3A	
96.6	22.8
97.5	23.8
97.8	25.0
92.7	27.3
B_2A	
98.1	27.3
99.9	28.2
103.2	31.0
104.0	32.9
104.2	33.3
103.6	33.5
BA	
143.8	36.3
166.1	38.5
197.2	43.0
214.0	46.1
230.5	49.5
232.0	50.0
229.8	50.7
213.6	53.4
207.5	54.7
A	
360	57.1

* Two liquid layers from 0.5 to 20.8.

B = KBr (214) (A.)
M. c. t.

t_{M_1}, °C*	t_{M_2}, °C*	M % B
Mix.		
542	**542**	0
560	566	5
575	587	10

* t_{M_1} = temp. of beginning of fusion; t_{M_2} = temp. of complete fusion

P_2O_5

B = PbO (15, 140)

t, °C	M % B
AB_2	
824	66.7
AB_2 + A_2B_5	
816E	67
A_2B_5	
920	70
A_2B_5 + AB_3	
940UE	71.4
AB_3	
1014	75
AB_3 + AB_4	
970E	77.5
AB_4	
980	80
895	85
AB_4 + AB_8	
840E	86.5
AB_8	
860	88.9
AB_8 + B	
820E	93
B	
890	100

H_3PO_3

B = H_3PO_4 (216) (S.)

t, °C	M % B
A	
73.6	0
65.8	9.1
53.7	21.5
42.4	31.5
23.8	43.7
+12.7	50.0
A + B	
−13.0E	61.0
B	
−10.5	62.5
+ 1.5	68.8
21.0	81.8
30.3	91.5
35.0	100

$POCl_3$

B = Cl_2O, ICl, ICl_3, SO_3, SCl_2, S_2Cl_2, S_2Br_2, N_2O_5, PCl_3, PCl_5, PBr_3, PBr_5, AsF_3, $AsCl_3$, $AsBr_3$, $SbCl_5$, $SbBr_3$, $BiCl_3$, $BiBr_3$, CCl_4, $SiCl_4$, $SiBr_4$, $SnCl_4$, OsO_4 (174, 175, 176, 181, 267) (S.)

M. P. of A = 1.25°
k_A = 7.1

PBr_3

B = $AlBr_3$ (117) (A.)

t, °C	M % A
B(α)	
93.0	0
91.8	1.41
89.5	4.04
88.1	5.57
k_B = 22.5 (0.22)	
B(α) + B(β)	
70.2	(?)
B(α) (130)	
97.1	0
91.3	7.3
84.1	14.4
76.6	22.4
B (β) (130)	
67.3	31.5
53.6	44.0
45.4	49.1

PI_3

B = AsI_3 (120)

t, °C	M % A	
Mix_1		
141.5	0	0
137	(2)	10
132	(4)	20
124	(7)	30
117	(9)	40
108	(11)	50
98	(13)	60
87	(15)	70
74	(17)	80
Mix_1 + Mix_2		
73.5U	17	82
	76	82
Mix_2		
68	(82)	90
61	100	100

B = SbI_3 (120)

t, °C	M % A
B	
170	0
163	10
138	40
108	65
B + A	
52E	91
A	
58	95
61	100

As_2O_3

B = $SbCl_3$* ([29]) (A.)

t, °C	M % A
B (? Mix.)	
72.0	0
70.9	0.89
70.1	1.61
69.7	3.32

* Reciprocal salt mixtures.

As_2O_5

B = PbO ([15])

t, °C	M % B
AB_2	
802	66.7
$AB_2 + AB_3$	
792E	67.5
AB_3	
905	70
1042	75
937	80
$AB_3 + AB_4$	
834U	83
$AB_4 + AB_8$	
815E	83.5
AB_8	
830	85
862	88.9
835	92.5
AB_8 + B	
804E	95
B	
890	100

B = Na_3AsO_4 ([13]) *v.* Fig. 11

B = K_3AsO_4 ([13]) *v.* Fig. 12

$AsCl_3$

B = $AsBr_3$ ([86, 254]) (A.)

t, °C	M % A
Mix. (?)	
30.3	0
28.8	1.79
27.3	4.07
25.7	6.04

B = $SbCl_3$ ([254]) (A.)

Mix. (?)	
73.2	0
71.2	3.06
69.8	5.50
67.3	9.96

$AsBr_3$

B = AsI_3 ([86, 266]) (A.)

t, °C	M % B
Mix. (?)	
31.0	0
30.2	1.20
29.4	2.41
27.3	5.99

B = $SbCl_3$* ([86, 254, 266]) (A.)

t, °C	M % B
A (? Mix.)	
31.0	0
30.3	2.48
29.7	5.08
29.4	6.60
B (? Mix.)	
67.7	95.35
70.3	97.58
71.7	98.75
73.2	100

B = $SbBr_3$ ([206]) (A.)

t, °C	M % B	
Mix.		
31	0	0
36	(20)	10
44.5	(36)	20
50.5	(50)	30
59.0	(61)	40
65	(70)	50
70.5	(77)	60
75.5	(83)	70
81	(89)	80
86	(97)	90
90	100	100

B = SbI_3* ([266]) (A.)

t, °C	M % B
A (? Mix.)	
31.0	0
30.8	1.40
30.7	4.23
31.1	7.05

B = $SnBr_4$ ([254]) (A.)

A	
31.0	0
30.4	1.00
29.8	1.95
28.9	3.53

k_A = 19.4 (0.12).

B = SnI_4* ([86, 266]) (A.)

A (? Mix.)	
31.0	0
29.6	1.08
28.3	2.12
26.1	4.18

B = $FeCl_3$* ([266]) (A.)

A (? Mix.)	
31.0	0
30.8	0.25

B = $AlBr_3$ ([118])

t, °C	M % A
B	
97.4	0
87.4	10
77.6	20
37.9	70
B + A	
28.0E	85

* Reciprocal salt mixtures.

B = $AlBr_3$.—(*Continued*)

t, °C	M % A
A	
29.4	90
32.0	100

AsI_3

B = $SbCl_3$* ([29, 254]) (A.)

B (? Mix.)	
73.2	0
70.3	1.05
66.3	2.66
64.5	3.44

B = $SbBr_3$* ([86, 254]) (A.)

B (? Mix.)	
94.2	0
92.6	1.54
89.7	4.71
88.3	6.37

B = SbI_3 ([120, 208, 259])

t, °C	M % A	
Mix.		
170	0	0
160	(8)	10
152	(16)	20
146	(24)	30
140	(36)	40
137		50
136		60
135		70
136		80
138		90
140.7	100	100

* Reciprocal salt mixtures.

As_2S_3

B = PbS ([265])

t, °C	M % B	
A		
540	0	
495	10	
440	20	
A + Mix.		
422E	50	23
Mix.		
490	54	30
545	60	40
570	63	50
580	64	60
AB_2 + B		
580U	65	
B		
745	70	
925	80	
1030	90	
1109	100	

B = Tl_2S ([59])

t, °C	M % A
B	
448.5	0
401	10
335	20
B + BA_3	
295U	25

B = Tl_2S.—(*Cont'd*)

t, °C	M % A
$BA_3 + BA_2$ (?)	
(?)	(?)
BA_2	
278	33.4
$BA_2 + B_2A_3$	
200E	36
B_2A_3	
317	40
B_2A_3 + BA	
215E	46
BA	
300	50
269	52

B = Ag_2S ([123])

B(α)	
842	0
610	10
B(α) + B_3A	
469E	17
B_3A	
480	20
490	25
475	30
B_3A + BA	
399E	40
BA	
417	50
413	60
408	70
403	80
Solid state	
B(α) + B(β)	
179	0–25

As_2Se_3

B = Ag_2Se ([195]) (A.)

B	
880	0
B + A_4B_3	
365E	33.3
A_4B_3	
(?)	57.1

Sb_2O_3

B = Sb_2S_3 ([208])

t, °C	M % B
A	
656	0
620	10
595	20
580	30
555	40
530	50
A + AB_5	
488E	66.5
AB_5	
513	75
AB_5 + B	
522U	80
B	
543	90
548	100

SbF_5

B = $SbCl_5$ ([218]) *v.* Fig. 13

$SbCl_3$

B = $SbCl_5$ ([21, 163]) (A.)

t, °C	M % A
B	
2.8	0
1.7	2.17
1.4	2.80
1.1	3.35
1.0	3.57
A	
11.5	5.54
13.5	5.55
B	
4.0	0
2.5	4.0
A	
24.0	10.4
39.0	17.4
48.5	27.5
54.0	39.8
59.0	55.3
62.5	71.7
65.0	80.1
70.0	93.5
73.0	100

B = $SbBr_3$ ([34])

t, °C	M % A	
Mix_1		
93	0	0
75	6	10
63	13	20
$Mix_1 + Mix_2$		
54E	30	30
Mix_2		
56	58	40
57	67	50
59.5	78	60
62	85	70
65	91	80
69	96	90
73	100	100

B = SbI_3 ([34])

t, °C	M % A
B	
165	0
145	10
130	20
116	30
103	40
90	50
77	60
62	70
B + A	
41E	82
A	
50	90
73	100

B = $BiCl_3$ ([254]) (A.)

t, °C	M % B
Mix.	
73.2	0
74.7	0.81
75.4	1.18
77.7	2.00

B = $SnCl_2$ ([130]) (A.)

M. c. t.

t, °C	M % B
A	
73.4	0
A_xB	
74.9	0.10
169.0	0.71
174.9	0.85
243.1	1.4*
243.1	91.2
242.1	91.7
240.7	92.7
B	
241.3	94.7
244.5	97.9
246.8	100

* Two liq. layers from 1.4 to 91.2.

B = $SnCl_4$ ([130, 254]) (A.)

M. c. t.

A	
73.4	0
70.9	4.6
69.4	6.2
67.7	13.5
67.0	17.8
66.8	19.1
66.5	23.9
66.3	35.8*
+66.3	73.5
−30.5	99.7
B	
−30.5	99.7
−30.2	100

* Two liq. layers from 35.8 to 73.5.

B = $SnBr_4$† ([254]) (A.)

t, °C	M % A
B (? Mix.)	
29.9	0
27.5	1.65
25.6	3.25

B = SnI_4† ([29]) (A.)

t, °C	M % B
A (? Mix.)	
72.0	0
70.6	0.49
69.1	1.12

† Reciprocal salt mixtures.

B = $HgCl_2$ ([130]) (A.)

M. c. t.

A	
73.4	0
72.6	2.0
71.9	3.3
B	
85.4	5.2
101.7	6.5
126.3	9.8
142.1	13.1
183.5	25.4

B = $HgCl_2$.—*(Continued)*

t, °C	M % B
B	
218.8	44.3
234.5	58.4
246.4	69.6
257.1	79.6
264.2	86.1

B = $HgBr_2$ (130) (A.)

0.42 M % B is sol. in A at 74°; 0.61 M % at 235°; < 2.0 M % at 300°.

B = CuCl (130) (A.)

< 0.3 M % B dissolves in A at 300°.

B = AgCl (130) (A.)

< 0.2 M % B sol. in A at 300°.

B = $AlCl_3$ (130) (A.)

M. c. t.

t, °C	M % A
B	
190.2	0
190.0	3.6
188.6	17.1
181.6	32.2
173.6	41.4
160.7	52.2
147.6	59.5
137.3	64.2
106.1	77.0
83.0	84.8
A	
69.9	92.5
71.1	95.9
73.4	100

B = $BaCl_2$ (130) (A.)

< 0.4 M % B sol. in A at 300°.

B = LiCl (130) (A.)

< 0.6 M % B is sol. in A at 300°.

B = NaCl (130) (A.)

B is practically insol. in A up to 300°C.

B = KCl (130) (A.)

M. c. t.

t, °C	M % B
A(α)	
73.4	0
72.4	0.74
71.8	1.6
69.8	4.4
68.9	5.5
68.3	6.4
A(β)	
67.4	8.7
64.6	11.8

B = KCl.—*(Cont'd)*

t, °C	M % B
A(β)	
62.0	15.0
59.2	18.0
A(γ)	
60.3	19.0
58.0	22.2
57.0	23.8
AB	
69.8	28.0
79.7	29.5
94.8	32.6
109.4	36.2
113.3	37.9
A_2B_3 (?)	
118.3	39.2
162.5	41.0
250.5	46.8
277.1	48.8
320.0	54.7
B	
360.0	58.5
433.5	61.7
533.0	68.7

B = KBr* (253) (A.)

A (? Mix.)	
73.2	0
71.8	1.12
71.0	1.68
69.9	2.95

$SbCl_5$

B = ICl, ICl_3, $SbCl_3$, SbI_3, CCl_4, $InCl_4$, $SnCl_4$, $SnBr_4$, SnI_4, CrO_3, $Cr(OCl)_2$ (30, 163) (S.)

M. P. of A = 2.9°

k_A = 18.5

B = $SnCl_4$ (163) (A.)

t, °C	M % B
A	
2.8	0
1.8	1.56
1.4	2.15
1.0	2.90

k_A = 18.2 (0.1).

B = $SnBr_4$* (163) (A.)

A (? Mix.)	
2.9	0
+1.4	0.51
−0.4	1.10

B = SnI_4* (163) (A.)

A (? Mix.)	
2.8	0
1.6	0.24
0.0	0.59

* Reciprocal salt mixtures.

B = $AuCl_3$ (163) (A.)

t, °C	M % B
A	
2.8	0
2.5	0.35
2*	0.70

* Not dissolved at 2°.

$SbBr_3$

B = SbI_3 (34)

t, °C		M % A
Mix₁		
165	0	0
157	7	10
148	15	20
138	24	30
127	33	40
117	41	50
105	50	60
96	59	70
88	71	80
Mix_1 + Mix_2		
84E	85	85
Mix_2		
86	96	90
93	100	100

B = $BiBr_3$ (254) (A.)

t, °C	M % B
Mix.	
94.2	0
93.6	0.78
93.1	1.37
92.6	2.00

B = $SnBr_4$ (254) (A.)

A	
94.2	0
93.5	1.15
91.9	3.75
90.7	5.76
B	
28.0	94.13
28.0	95.31
28.1	96.75
28.9	98.56
29.9	100

B = $HgBr_2$ (98) (A.)

t, °C	M % A
B	
235.0	0
233.8	1.23
232.0	3.07
230.2	4.88
229.0	6.13

k_B = 33.6 (0.18).

B = $AlBr_3$ (118)

B	
97.4	0
93.2	9.9
84.4	24.5
B + BA	
(72)E	(32)

B = $AlBr_3$.—*(Continued)*

t, °C	M % A
BA	
76.6	37.6
(82.5)	50
79.8	58.0
74.6	64.8
BA + A	
(70)E	(71)
A	
75.8	77.0
90.5	91.6
95.5	100

Sb_2S_3

B = BiS (249)

t, °C	M % B	
Mix.		
494	0	0
505	36	10
520	48	20
534	57	30
546	63	40
560	69	50
576	75	60
595	81	70
622	87	80
660	95	90
680	100	100

B = SnS (188)

t, °C	M % B
A	
545	0
522	10
500	20
477	30
A + AB	
460E	36
AB + B	
480U	41.5
B	
593	60
650	70
715	80
795	90
850	100

B = PbS (116, 123)

A	
516	0
480	10
A + AB(α)	
428E	18
AB(α)	
468	25
522	35
AB(α) + A_2B_3	
548U	40
A_2B_3 + AB_2	
610U	51
AB_2	
661	60
671	66.7
636	75
AB_2 + A_2B_5(α)	
592U	79
A_2B_5(α) + B	
560E	84

B = PbS.—*(Cont'd)*

t, °C	M % B
B	
640	90
760	95
1051	100
Solid state	
AB(α) + AB(β)	
517	50-66.7
A_2B_5(α) + A_2B_5(β)	
470	66.7–(100)

k_A = 78.9 (0) (85) (A.).

B = HgS (194) (A.)

A	
555.0	0
540	6.97
525	13.06
505	22.15
487	30.48

k_A = 78.8 (0).

B = CuS (194) (A.)

A	
555	0
540	6.10
532	9.17
521	13.18
503	19.23

k_A = 79.7 (0).

B = Cu_2S (186)

t, °C	M % A
B	
1115	0
990	5
810	15
B + B_3A	
610E	24
B_3A	
610	25
590	35
548	50
B_3A + BA	
542U	59
BA	
515	70
BA + A	
490E	76.5
A	
525	90
545	100

B = Ag_2S (123, 136)

t, °C	M % B
A	
546	0
515	10
483	20
A + AB	
449E	28.5
AB	
459	30
497	40
509	50
482	60

B = Ag_2S.—*(Continued)*

t, °C	M % B
AB + AB_3	
455E	64.5
AB_3	
475	70
483	75
470	80
AB_3 + B	
463E	81
B	
600	90
842	100

k_A = 79.4 (0.00) (85) (A.)

k_B = 810.8 (0.00) (105) (A.)

SbSe

B = Ag_2Se (195) (A.)

t, °C	M % A
B	
880	0
B + A_2B	
492E	46
A_2B	
553	66.6
A_2B + A	
492E	94.1

Sb_2Se_3

B = Ag_2Se (195) (A.)

B	
880	0
B + A_4B_3	
540E	20
A_4B_3	
650	57.1
A_4B_3 + A	
573E	(?)
A	
615	100

Sb_3Se_4

B = Ag_2Se (195) (A.)

B	
880	0
B + AB	
515E	13.3
AB	
(?)	50.0
AB + A	
525E	80.0

Bi_2O_3

B = PbO (32)

B	
870	0
775	10
680	20
B + B_2A	
580E	28
B_2A	
605	30
625	33.3

Bi_2O_3.—(*Continued*)

B = PbO.—(*Continued*)

t, °C	M % A
$B_2A + B_2A_3$	
609E	36.5
B_2A_3	
625	40
660	50
686	60
$B_2A_3 + BA_4$	
680E	64
$BA_4 + A$	
690U	66.5
A	
705	70
745	80
785	90
817	100

$BiCl_3$

B = $PbCl_2$ (110)

B	
501	0
475	10
450	20
420	30
390	40
365	50
340	60
$B + A_xB_y$	
325U	67
A_xB_y	
315	70
275	80
$A_xB_y + A$	
215E	89
A	
218	90
224	100

B = TlCl (233)

B		
429	0	
380	10	
$B + B_3A$		
360E	12.5	
B_3A		
395	20	
413	25	
403	30	
342	40	
$B_3A + B_2A$		
330U	41	
B_2A		
250	50	
$B_2A + B_3A_2$		
225U	52	
B_3A_2		
175	60	
B_3A_2 + Mix.		
150E	67.5	
Mix.		
157	77	70
180	89	80
203	96	90
224	100	100

B = $ZnCl_2$ (110)
v. Fig. 14

B = CuCl (110)

t, °C	M % A
B	
424	0
395	10
360	20
325	30
288	40
250	50
210	60
B + A	
190E	64.5
A	
197	70
205	80
215	90
224	100

B = $FeCl_3$ (110)

t, °C	M % B
A	
224	0
210	10
193	20
175	30
A + B	
171E	32
B	
195	40
218	50
233	60
243	70
253	80
271	90
298	100

$BiBr_3$

B = $PbBr_2$ (110)

t, °C	M % A
B	
380	0
368	10
340	20
307	30
282	40
257	50
$B + A_xB_y$	
240U	57
$A_xB_y + A$	
206E	75
A	
208	80
214	90
219	100

B = $AlBr_3$ (118)

B	
97.4	0
B + BA	
93.5E	16.3
BA	
121.8	28.9
142.2	40.2
(149)	50
134.9	59.8

B = $AlBr_3$.—(*Continued*)

t, °C	M % A
BA + A	
(125)E	(65)
A	
133.8	68.2
182.4	82.3
218.8	100

Bi_2S_3

B = Bi_2Te_3 (14)

B	
575	0
B + BA	
570E	3
BA	
584	10
598	20
607	30
612	40
BA + A	
615UE	50
A	
643	60
670	70
699	80
815	85

B = Ag_2Se (195) (A.)

B	
880	0
$B + A_4B_3$	
670E	12.5–14.2
A_4B_3	
773	57.1
$A_4B_3 + A$	
692E	(?)
A	
718	100

$Bi_2(MoO_4)_3$

B = $PbMoO_4$ (275)

t, °C	M % B
A	
643	0
638	10
628	20
A + B	
615E	27.5
B	
633	30
725	40
810	50
870	60
925	70
975	80
1020	90
1065	100

$Bi_2(WO_4)_3$

B = $PbWO_4$ (275)

A	
832	0
828	10
820	20
A + B	
814E	26.5

B = $PbWO_4$.—(*Continued*)

t, °C	M % B
B	
820	30
844	40
876	50
916	60
965	70
1020	80
1076	90
1130	100

CBr_4

B = $AlBr_3$ (118)

t, °C	M % A
B	
97.4	0
84.9	10.7
66.1	25.8
54.0	35.9
B + A	
(40)E	52
A	
43.7	59.9
57.1	73.1
71.9	84.8
92.0	100

CS_2

B = P_4S_3(?) (247) (S.)

t, °C	*x**
−20	9
0	3.7
+17	1

B = P_4S_7 (247) (S.)

0	20 000
17	3 500

B = P_4S_{10} (247) (S.)

−20	1 200
0	550
+17	450

**x* = parts CS_2 to dissolve 1 part solute.

B = $HgCl_2$ (18) (S.)

t, °C	Wt. %*
−10.25	0.016
0	0.019
+ 8	0.029
13.50	0.023(?)
19.50	0.045
25	0.055
29	0.062

B = $HgBr_2$ (18) (S.)

−10.25	0.049
0	0.087
+ 8	0.122
13.50	0.137
19.50	0.182
25	0.230
29	0.268

* Wt. % in solution.

B = HgI_2 (18) (S.)

t, °C	Wt. %*
−116	0.017
− 93	0.023
− 86.5	0.024
− 76.5	0.035
− 21	0.099
− 10.25	0.103
− 1.50	0.161
0	0.173
+ 8	0.238
13.50	0.269
19.50	0.315
25	0.387
29	0.435

B = SnI_4 (18) (S.)

−114.5	9.41
− 89	9.68
− 84	10.22
− 58	16.27

* Wt. % in solution.

HCN

B = KI (147) (A.)

t, °C	M % B
A	
−13.3	0
−13.5	0.93
−14.2	5.46
−14.3	6.69

B = KNO_3 (147) (A.)

A	
−13.3	0
−13.5	1.33
−13.7	2.14

NH_4CNS

B = $(NH_2)_2CS$
Thiourea (264)

A	
146	0
138	10
122	20
A + B	
100E	30
B	
112	40
120	50
126	60
132	70
136	80
140	90
142	100
Solid state	
A(α) + A(β)	
120	0
112	10
A(β) + A(γ)	
90	0–70

B = KCNS (264)
v. Fig. 15

For other systems in which one component is a C-compound, *v.* p. 185.

SiS_2

B = PbS (57)

t, °C	M % A
B	
1114	0
900	20
835	30
805	35
$B + B_2A$	
765U	39
$B_2A + B_3A_2$	
737U	42
B_3A_2	
702	44

Solid state
B_3A forms at 748°

B = Ag_2S (57)

B	
835	0
$B + B_4A$	
799E	2
B_4A	
917	10
959	20
875	30
$B_4A + B_3A_2$	
747E	35.5
B_3A_2	
756	40
728	45
$B_3A_2 + A$	
678E	47.5
A	
730	55

$SiC_{24}H_{20}$

Si tetraphenyl
B = $SnC_{24}H_{20}$ (189)
Sn tetraphenyl

t, °C	Wt. % B
Mix.	
233.0	0
221.0*	67.0
225.7	100

B = $PbC_{24}H_{20}$ (189)
Pb tetraphenyl

Mix.	
233.0	0
218.8*	66.0
227.7	100

* Min. t_L.

$TiBr_4$

B = $SnBr_4$ (72) (A.)

t, °C	M % A
Mix.	
29.1	0
29.4	3.38
29.5	4.72
29.9	6.85

$ZrBr_4$

B = $SnBr_4$ (72) (A.)

Mix.	
29.1	0
29.4	1.18
29.4	2.70

$SnCl_2$

B = $PbCl_2$ (110, 229)

t, °C	M % A	
Mix.		
501	0	0
470	7	15
445	13	30
425	19	40
400	25	50
380	32	60
350	40	70
315	54	80
285	66	90
247	100	100

B = TlCl (137)

t, °C	M % A
B	
435	0
388	10
B + B_3A	
299E	20
B_3A	
310	25
293	35
B_3A + BA	
234E	42
BA	
244	50
232	60
BA + A	
178E	72.5
A	
206	80
228	90
241	100

B = $ZnCl_2$ (110)

B	
261	0
259	10
238	30
220	40
B + A	
180E	58
A	
195	65
220	80
247	100

B = $CdCl_2$ (110, 229)

t, °C	M % A
B	
568	0
550	10
525	20
500	30
472	40
440	50
403	60
360	70
300	80
B + A	
233E	89.5
A	
250	100

B = CuCl (110)

B	
424 ↓	0
203 ↓	60
B + A	
172E	68.5
A	
212	80
233	90
247	100

B = $MnCl_2$ (229)

B	
650	0
630	10
605	20
580	30
552	40
517	50
480	60
433	70
375	80
297	90
B + A	
230E	95
A	
250	100

B = $AlCl_3$ (130) (A.)

M. c. t.

B	
190.2	0
B_xA	
191.0	0.98
191.3	1.11
192.0	1.5*
192.0	14.3
191.0	15.3
188.2	18.1
B_2A	
187.0	22.1
204.4	28.5
207.4	30.7
209.3	33.3
195.0	38.8
178.6	43.1
158.7	48.5
136.9m	53.9
BA	
158.5	50.0
158.2	50.7

B = $AlCl_3$.—(*Continued*)

t, °C	M % A
BA	
153.3	54.6
142.3	63.5
135.4m	69.8
A	
138.3	68.5
154.3	70.9
176.3	75.0
223.4	86.1
235.7	90.8
246.8	100

* Two liq. layers from 1.5 to 14.3.

B = $MgCl_2$ (159)

B	
711	0
690	10
660	25
597	50
530	70
490	80
380	95
B + A	
245E	>99
A	
245	100

B = $CaCl_2$ (159, 229)

B	
777	0
(745)	20
(705)	40
635	60
570	70
490	80
385	90
B + A	
245E	(100)
A	
245	100

B = NaCl (210)

t, °C	M % B
A	
239	0
230	10
210	20
A + B	
183E	32
B	
395	40
517	50
675	70
720	80
800	100

B = KCl (210)

A	
239	0
224	10
A + A_3B	
201E	16
A_3B	
206	20
208	25
197	35

B = KCl.—(*Continued*)

t, °C	M % B
A_3B + AB	
180E	38.5
AB	
210	45
AB + B	
224UE	50
B	
465	60
580	70
675	80
740	90
777	100

$SnCl_4$

B = $SnBr_4$ (85) (A.)

t, °C	M % A
Mix. (?)	
29.4	0
28.1	1.27
26.8	2.55
24.7	4.99

B = $AlCl_3$ (130) (A.)

M. c. t.

B	
190.2	0
188.6	6.8
182.6	19.3
174.2	34.8
167.8	47.3
158.3	63.2
150.0	74.4
139.5	83.4
130.9	89.6
122.0	93.2
113.4	95.9
89.9	98.8
+65.7	99.6
A	
−30.2	100

$SnBr_2$

B = $AlBr_3$ (130) (A.)

M. c. t.

B	
97.1	0
96.9	0.35
96.5	0.81
B_2A	
121.6	0.81
137.1	1.07
152.8	1.45
161.1	1.8*
161.1	14.2
162.2	16.4
164.3	18.5
178.5	24.7
190.2	28.3
205.0	33.3
202.0	34.9
181.8	41.5
175.4	43.7

B = $AlBr_3$.—(*Continued*)

t, °C	M % A
BA	
175.0	44.8
179.8	48.3
183.0	50.0
179.1	52.4
164.4	59.6
158.3	62.8
A	
175.1	71.2
195.9	78.1
220.9	90.8
228.2	96.2
232.0	100

* Two liq. layers from 1.8 to 14.2.

$SnBr_4$

B = SnI_4 (211)

v. Fig. 16

t, °C	M % B	
(?)		
206	0	
215	20	
231	40	
255	60	
289	80	
346	100	
Solid state A(α) + B(β) and A(β) + B(α)		
29.2	0	0
23	(8)	10
Mix_1 + Mix_2		
19.5E	22	22
Mix_2		
26	(32)	30
38	(43)	40
54	(54)	50
71	(64)	60
90	(74)	70
109	(83)	80
128	(92)	90
145	100	100

B = $AlBr_3$ (130) (A.)

M. c. t.

t, °C	M % A
B(α)	
97.1	0
94.3	2.5
85.4	13.4
76.4	22.7
B(α) + B(β)	
70.2	(?)
B(β)	
65.7	35.4
45.8	56.7
25.5	74.4
A	
22.3	76.0
23.4	82.5
27.6	93.3
31.0	100

SnS

B = PbS (109)

t, °C	Wt. % A	
Mix.		
1106	0	0
1005	6	20
898	9	40
Mix. + A		
880E	9	43

B = FeS (100)

t, °C	Wt. % B
A	
(870)	0
835	5
A + B	
785E	15
B	
805	20
850	30
905	40
960	50
1020	60
1070	70
1155	90
(1188)	100

$SnC_{24}H_{20}$

Sn tetraphenyl

B = $PbC_{24}H_{20}$ (189)

Pb tetraphenyl

Mix.*	
225.7	0
227.7	100

* Neither max. nor min. t_L.

B = $HgC_{10}H_{12}$ (56)

Hg tetraphenyl

t, °C	M % B
A	
223.0	0
A + B	
115.0E	97.0
B	
121.8	100

PbO

B = PbF_2 (228)

t, °C	M % A
B	
824 ↓	0
517 ↓	50
B + A	
492E	54
A	
547 ↓	60
892 ↓	100

B = $PbCl_2$ (217)

B	
499	0
475	10
B + BA	
436E	23
BA	
475	30
BA + BA_2	
524U	40

PbO.—(*Cont'd*)

B = $PbCl_2$.—(*Continued*)

t, °C	M % A
BA_2	
610	50
675	60
693	66.7
BA_2 + Mix.	
690E	72 | 70
Mix.	
705	76 | 75
BA_4	
711	80
$BA_4 + A$	
703E	85
A	
760	90
835	100

B = $PbBr_2$ (228)

t, °C	M % A
B	
368	0
358	5
B + BA	
348E	13
BA	
425	20
470	30
$BA + BA_2$	
476U	35
BA_2	
515	40
630	50
712	66.7
$BA_2 + BA_4$	
700E	76
$BA_4 + A$	
742UE	80
A	
798	90
892	100

B = $PbSO_4$ (122, 238)

t, °C	M % B
A	
879	0
$A + A_3B$	
835E	11
$A_3B + A_2B$	
897U	17.5
A_2B	
950	25
961	33.3
$A_2B + AB$	
950E	40
AB	
977	50
972	60
AB + B	
960E	68
B(α)	
1007	70
1092	80
(1170)	100
Solid state	
B(α) + B(β)	
864	50–100

B = CuO (66) (A.)

t, °C	M % B
A	
875	0
850	5.06
818	12.29
797	17.96
774	27.11
727	42.58
712	49.60
A + (?)	
698E*	59.12
(?)	
712	69.66

* All mixtures give a halting pt. at *ca.* 698°.

B = Ag_2O (135) (A.)

At *ca.* 840°, 3–6 Wt. % Ag dissolves in molten A, forming B.

B = $PbCrO_4$ (122)

t, °C	M % B
A	
879	0
850	5
$A + A_4B$	
785E	11
$A_4B + A_5B_2$	
815U	16
A_5B_2	
830	20
854	28.6
$A_5B_2 + AB$	
841E	32
AB	
905	40
920	50
910	60
AB + Mix.	
820E	99 | 87
B	
844	100
Solid state	
$A_5B_2(\alpha) + A_5B_2(\beta)$	
744	29–50
B(α) + B(β)	
785	50–98
783	100
B(β) + B(γ)	
701	50–98
707	100

B = $PbMoO_4$ (122)

t, °C	M % A
B	
879	0
810	10
B + BA	
762E	12
BA	
878	20
920	30
940	40
951	50
BA + A	
933E	60
A	
998	70

B = $PbMoO_4$.—(*Continued*)

t, °C	M % A
A	
1032	80
1052	90
1065	100

B = $PbWO_4$ (122)

t, °C	M % B
A	
879	0
810	10
A + AB	
722E	17
AB	
780	20
855	30
885	40
899	50
AB + B(α)	
892E	53
B(α)	
975	60
1037	70
1087	85
1123	100
Solid state	
B(α) + B(β)	
877	(50)–100

B = V_2O_5 (15)

t, °C	M % A
B	
660	0
653	10
633	20
602	30
554	40
$B + BA_2$	
475E	50
BA_2	
610	55
677	60
722	66.7
$BA_2 + BA_3$	
718E	68
BA_3	
870	70
952	75
885	80
$BA_3 + BA_8$	
755E	84
BA_8	
794	88.9
$BA_8 + A$	
760E	93
A	
817	95
890	100

B = B_2O_3 (156) (A.)

t, °C	M % B
AB	
250	36.50
450	41.60
500	51.50
485	52.80
420	59.50

B = B_2O_3.—(*Continued*)

t, °C	M % B
$AB + AB_2$	
360E	61.10
AB_2	
450	62.42
550	65.25
570	65.66
520	67.84
475	68.20
$AB_2 + A_2B_5$	
460E	69.70
A_2B_5	
475	69.55
520	71.10
$A_2B_5 + AB_3$	
490E	72.83
AB_3	
530	74.46
560	76.10
480	78.10

PbF_2

B = $PbCl_2$ (224)

t, °C	M % A	
Mix_1		
495	0	0
$Mix_1 + Mix_2$		
453E	3	10
	48	10
Mix_2		
525	(49)	20
570	(49.5)	30
593	(50)	40
BA		
601		50
Mix_3		
592	(52)	60
570	(56)	70
$Mix_3 + BA_4$		
554E	58	75
$BA_4 + A$		
570UE		80
A		
695		90
824		100

B = $PbBr_2$ (224)

t, °C	M % A
B	
366	0
B + BA	
349E	5
BA	
420	10
495	20
530	30
550	40
561	50
555	60
537	70
$BA + BA_4$	
533E	75
$BA_4 + B$	
585UE	80
B	
695	90
824	100

B = PbI_2 (224)

t, °C	M % A
B	
400	0
B + BA	
383E	10
$BA + BA_4$	
434U	20
BA_4	
472	30
499	40
524	50
548	60
564	70
$BA_4 + A$	
573U	75
A	
607	80
645	85
825	100

B = $Pb_3(PO_4)_2$ (16)

t, °C	M % B
A	
820	0
$A + AB_3$	
698E	8
AB_3	
847	20
925	30
1035	50
1083	65
1098	75
1080	85
1032	95
$AB_3 + B$	
1004E	98
B	
1014	100

B = $Pb_3(AsO_4)_2$ (14)

t, °C	M % B
A	
820	0
$A + AB_3$	
675E	8
AB_3	
790	20
910	35
983	50
1015	60
1042	75
1032	85
$AB_3 + B$	
1018E	90
B	
1042	100

B = $Pb_3(VO_4)_2$ (16)

t, °C	M % B
A	
820	0
$A + AB_3$	
803	30
847	40
880	50
910	65
916	75
$AB_3 + B$	
912E	82

B = $Pb_3(VO_4)_2$.—(*Continued*)

t, °C	M % B
B	
928	90
952	100

B = NaF (205)

t, °C	M % A
B	
1040	0
990	10
930	20
872	30
808	40
735	50
650	60
B + A	
540E	67.5
A	
630	75
730	85
855	100

k_B = 18.7 (0.6) (A.)

$PbCl_2$

B = $PbBr_2$ (162)

t, °C	M % B
Mix. + liq.	
495 |	0
370 ↓	100

B = PbI_2 (162)

t, °C	M % B
A	
495	0
457	10
425	20
400	30
375	40
352	50
335	60
316	70
A + B	
306E	76
B	
315 |	80
358 ↓	100

B = PbS (256)

t, °C	M % B
A	
499	0
478	10
A + B	
442E	22
B	
560	35
835	65
1030	90
1106	100

B = $Pb_3(PO_4)_2$ (16)

t, °C	M % B
A	
494	0
$A + AB_3$	
480E	5
AB_3	
700	10
910	20
1005	30
1065	40

B = $Pb_3(PO_4)_2$.—(*Continued*)

t, °C	M % B
AB_3	
1110	50
1135	60
1156	75
1130	85
1050	95
$AB_3 + B$	
994E	98.5
B	
1014	100

B = $Pb_3(AsO_4)_2$ (16)

A	
494	0
A + AB_3	
478E	3.5
AB_3	
843	20
945	30
1010	40
1070	50
1110	60
1140	75
1120	85
1078	95
$AB_3 + B$	
1040E	98
B	
1042	100

B = $Pb_3(VO_4)_2$ (16)

A	
494	0
A + AB_3	
468E	4
AB_3	
620	10
820	25
915	40
950	50
975	60
990	75
970	85
943	90
$AB_3 + B$	
912E	94
B	
952	100

B = TlCl (137)

t, °C	M % A
B	
435	0
405	10
B + B_3A	
388E	13.5
B_3A	
407	25
400	35
$B_3A + BA_2$	
378E	41
BA_2	
410	50
430	60
435	66.7

B = TlCl.—(*Continued*)

t, °C	M % A
BA_2 + A	
428E	74
A	
448	80
480	90
500	100

B = $ZnCl_2$ (110)

t, °C	M % B
A	
501	0
460	20
420	35
375	50
348	60
325	70
307	80
273	95
A + B	
261E	>99
B	
261	100

B = $CdCl_2$ (110, 229)

A	
501	0
460	15
400	30
A + B	
385E	39
B	
422	50
452	60
483	70
513	80
542	90
568	100

B = CuCl (110)

A	
501	0
437	20
358	40
312	50
A + B	
280E	57
B	
286	60
310	70
347	80
388	90
424	100

B = AgCl (255, 257)

A	
496	0
465	10
437	20
406	30
375	40
342	50
A + B	
310E	60

B = AgCl.—(*Continued*)

t, °C	M % B
B	
342	70
383	80
428	90
457	100

B = $MnCl_2$ (229)

t, °C	M % A
B	
650	0
630	10
605	20
575	30
540	40
500	50
457	60
B + A	
408E	70
A	
430	80
460	90
495	100

B = $FeCl_3$ (110)

t, °C	M % B
A	
501	0
470	20
385	40
A + B	
177E	63
B	
257	80
283	90
298	100

B = $BeCl_2$ (280)

B = $MgCl_2$ (159)

t, °C	M % A
B	
711	0
680	15
643	30
555	60
B + A	
459E	81
A	
482	90
496	100

B = $CaCl_2$ (159, 229)

B	
772	0
738	10
704	20
670	30
635	40
602	50
568	60
530	70
485	80
B + A	
467E	82
A	
485	90
495	100

B = $SrCl_2$ (229)

t, °C	M % A	
Mix.		
872	0	0
855	(6)	10
790	(13)	20
710	(27)	40
665	(35)	50
615	(45)	60
565	(57)	70
535	(67)	80
515	76	90
505	82	95
495	100	100

B = $BaCl_2$ (229)

Mix_1		
960	0	0
928	(2)	5
$Mix_1 + Mix_2$		
912*	(3)	8
	2	8
Mix_2		
860	(6)	20
805	(12)	30
750	(20)	40
685	(30)	50
625	(41)	60
570	(55)	70
535	(67)	80
512	80	90
495	100	100

* B(α) → B(β) lowered from 923° at M = 0.

B = LiCl (255)

t, °C	M % B
A	
496	0
420 ↓	40
A + B	
410E	44.5
B	
464	60
521	75
585	90
607	100

B = NaCl (255)

A	
496	0
476	10
445	20
A + B	
410E	28.5
B	
478	40
540	50
610	60
675	70
725	80
768	90
798	100

B = KCl (151, 255)

A	
496	0
475	10
441	20

B = KCl.—(*Continued*)

t, °C	M % B
A + A_2B	
429E	23
A_2B	
440	33.3
433	40
$A_2B + AB_2$	
411E	48.5
AB_2	
430	50
464	55
AB_2 + B	
490U	62
B	
580	70
667	80
730	90
775	100

B = RbCl (255)

A	
496	0
448	15
A + A_2B	
410E	23
A_2B	
424	33.3
A_2B + AB	
407E	39
AB	
435	45
440	50
AB + AB_2	
414E	58.5
AB_2 + B	
449U	64.5
B	
510	70
605	80
680	90
724	100

$PbBr_2$

B = PbI_2 (162)

A	
370	0
348	10
326	20
302	30
276	40
A + B	
256E	47
B	
278 ↓	60
358 ↓	100

B = $HgBr_2$ (229)

t, °C	M % A
B	
238	0
B + A	
233E	5
A	
252	10
270	20
279	30

B = $HgBr_2$.—(*Continued*)

t, °C	M % A
A	
283	40
288	50
297	60
309	70
324	80
344	90
366	100

B = AgBr (257)

t, °C	M % B
B	
422	0
395	10
365	20
330	30
295	40
B + A_2B	
276E	45.2
A_2B	
282	50
290	60
A_2B + B	
295UE	66.7
B	
302	70
320	80
344	90
373	100

$PbBr_2$

B = $AlBr_3$ (130) (A.)

M. c. t.

t, °C	M % A
B	
97.1	0
B_2A	
191.9	0.6
210.4	0.8*
210.4	16.2
211.9	16.9
220.4	20.1
235.5	23.7
253.5	27.0
272.5	32.5
274.0	33.3
266.9	37.0
241.6	43.6
234.9	45.5
A	
268.4	52.3
296.8	57.7

* Two liq. layers from 0.8 to 16.2.

PbI

B = HgI_2 (98) (A.)

B	
250.0	0
247.4	3.11
241.2	6.04

k_B = 56.5 (0).

PbI_2

B = AgI (257)

t, °C	M % A
Mix. + liq.	
552	0
465	10
395*	20
373	30
357	40
349	50
344	60
357	70
372	80
387	90
402	100
Solid state	
$B_4A(\alpha) + B_4A(\beta)$	
115	0–80
$B(\alpha) + B(\beta)$	
144.6	0–20

* M. P. of B_4A.

PbS

B = Tl_2S (59)

t, °C	M % B	
Mix_1		
1108	0	0
1000	(3)	10
825	(8)	20
520	(14)	30
$Mix_1 + Mix_2$		
282E	18	38
	88	38
Mix_2		
295	(89)	40
320	(91)	50
358	(93)	60
383	(96)	70
418	(96)	80
435	(99)	90
448.5	100	100

B = ZnS (79)

t, °C	Wt. % B
A	
1115	0
A + B	
1048E	4
B	
1090	10
1275	20
1360	30
1405	40

B = Cu_2S (80)

A	
1114	0
988	10
875 ↓	20
565 ↓	50
A + B	
550E	51.5
B	
655 ↓	60
1055 ↓	90
1121	100

B = Ag_2S (79)

t, °C	Wt. % B
A	
1114	0
1040	10
970	20
905	30
845	40
780	50
715	60
660	70
A + B	
630E	76.5
$B(\alpha)$	
655	80
740	90
835	100
Solid state	
$B(\alpha) + B(\beta)$	
195	25–100

B = FeS (79)

A	
1114	0
1020	10
930	20
A + B	
869E	27
B	
890	30
960	40
1025	50
1108	70
1163	90
1187	100

$PbSO_4$

B = $PbCrO_4$ (122)
v. Fig. 17

B = $PbMoO_4$ (122)

t, °C	M % A	
Mix_1		
1065	0	0
1050	1	10
1027	2	20
1000	4	30
$Mix_1 + Mix_2$		
962E	6	42.5
	97	42.5
Mix_2		
986	(97)	50
1016	(98)	60
1048	(98)	70
1080	(99)	80
(1170)	100	100
Solid state		
$A(\alpha) + A(\beta)$		
879	(4)–98	
874	97	
864	100	

B = $PbWO_4$ (122)

t, °C	M % A	
Mix_1		
1123	0	0
1075	9	15
1035	16	30
1015	20	40

B = $PbWO_4$.—(*Continued*)

t, °C	M % A	
$Mix_1 + Mix_2$		
995E	23	50
	94	50
Mix_2		
1020	(95)	60
1055	(96)	70
1090	(97)	80
1130	(98)	90
1170	100	100
Solid state		
$A(\alpha) + A(\beta)$		
875	11–96	
864	100	
$B(\alpha) + B(\beta)$		
877	0	
859	3–95	

B = Li_2SO_4 (52)

$B(\alpha)$	
856	0
740	10
662	20
$B(\alpha)$ + A	
638E	25
A	
686	30
760	40
813	50
850*	60
1006	100
Solid state	
$B(\alpha) + B(\beta)$	
585	0–60

* Decompn. of A above 60 M %. At 856°, A transforms (?).

B = Na_2SO_4 (52)

Mix.		
887	0	0
907		7
895	(9)	15
845	(15)	30
787	(19)	40
Mix. + A		
735E	20	47
A		
788	55	
840	65*	
Solid state		
Mix. + A		
700	18	
600	12	
500	7	
400	4	
300	3	
$B(\alpha) + B(\beta)$		
235	0	
225	2–65	

* Decompn. of A above 65 M %. There is a transformation of A at 856°.

B = K_2SO_4 (52, 94)
v. Fig. 18

$Pb(NO_3)_2$

B = $NaNO_3$ (99) (A.)

t, °C	M % A
B	
305	0
B + (?)	
268E	16.15

B = KNO_3 (99) (A.)

B	
320	0
300	3.28
285	7.11
268	11.58
246	16.92
B + (?)	
207E	21.24
(?)	
210	23.42
238	31.44
(335) (?)	41.63

$Pb_3(PO_4)_2$

B = $Pb_3(AsO_4)_2$ (16) (A.)

t, °C	M % B
Mix.	
1014	0
1020	23.12
1028	47.42
1035	73.04
1042	100

B = $Pb_3(VO_4)_2$ (16) (A.)

Mix.	
1014	0
996	24.10
980	48.79
962	84.37
952	100

$3Pb_3(PO_4)_2.PbF_2$

B = $3Pb_3(PO_4)_2.PbCl_2$ (16) (A.)

Mix.	
1098	0
1108	19.80
1126	49.70
1144	79.80
1156	100

B = $3Pb_3(AsO_4)_2.PbF_2$ (16) (A.)

Mix.	
1098	0
1086	23.28
1072	47.66
1058	73.20
1042	100

B = $3Pb_3(VO_4)_2.PbF_2$ (16) (A.)

Mix.	
1098	0
1052	24.18
1012	48.90
960	74.16

B = $3Pb_3(VO_4)_2.PbF_2$.—(*Continued*)

t, °C	M % B
Mix.	
935	89.60
916	100

$3Pb_3(PO_4)_2.PbCl_2$

B = $3Pb_3(AsO_4)_2.PbCl_2$ (16) (A.)

Mix.	
1156	0
1152	28.08
1150	47.67
1145	78.46
1140	100

B = $3Pb_3(VO_4)_2.PbCl_2$ (16) (A.)

Mix.	
1156	0
1116	19.30
1056	48.90
1012	79.30
990	100

$Pb_3(AsO_4)_2$

B = $Pb_3(VO_4)_2$ (16) (A.)

Mix.	
1042	0
1018	26.04
994	51.36
968	76.00
960	90.48
952	100

$3Pb_3(AsO_4)_2.PbF_2$

B = $3Pb_3(AsO_4)_2.PbCl_2$ (16) (A.)

Mix.	
1042	0
1060	9.89
1087	29.76
1107	49.72
1128	79.82
1140	100

B = $3Pb_3(VO_4)_2.PbF_2$ (16) (A.)

Mix.	
1042	0
1008	25.96
978	51.25
944	75.92
916	100

$3Pb_3(AsO_4)_2.PbCl_2$

B = $3Pb_3(VO_4)_2.PbCl_2$ (16) (A.)

Mix.	
1140	0
1096	20.80
1062	51.24
1010	80.78
990	100

$PbCrO_4$

B = $PbMoO_4$ (122)

t, °C	M % B	
Mix_1		
844	0	0
$Mix_1 + Mix_2$		
838E	2	(22)
	53	(22)
Mix_2		
872	60	(30)
920	70	(43)
970	80	(60)
1020	90	(80)
1065	100	100
Solid state		
$A(\alpha) + A(\beta)$		
783	0	
799	2–53	
$A(\beta) + A(\gamma)$		
707	0	
697	28–57	

B = $PbWO_4$ (122)

Mix_1		
844	0	0
$Mix_1 + Mix_2$		
837E	2	(23)
	59.5	(23)
Mix_2		
935	70	(46)
1010	80	(66)
1070	90	(84)
1123	100	100

$PbMoO_4$

B = $PbWO_4$ (122)

Mix_1		
1065	0	0
1070	21	10
1076	35	20
1080	41	30
$Mix_1 + Mix_2$		
1082U	43	35
	60	35
Mix_2		
1093	72	50
1100	79	60
1107	85	70
1112	90	80
1118	95	90
1123	100	100

B = $Y_2(MoO_4)_3$ (274)

t, °C	M % A
B	
1347	0
1285	20
1235	30
1130	45
1030	55
B + A	
975E	59
A	
1012	70
1030	80
1040	90
1065	100

B = $La_2(MoO_4)_3$ (274)

t, °C	M	% A
Mix.		
1181	0	0
1168	6	10
1153	15	20
1135	27	30
1118	36	40
1104	45	50
1093	54	60
1084	62	70
1076	70	80
1070	80	90
1065	100	100

B = $Ce_2(MoO_4)_3$ (274)

t, °C	M	% B
Mix.		
1065		0
1070		5
1073		13
1068		20
1056		30
1042		40
1028	(30)	50
1012	(40)	60
996	(50)	70
977	(70)	80
951	(85)	90
Mix. + B		
938E	94	94
B		
973		100

B = $Pr_2(MoO_4)_3$ (274)

t, °C	M	% A
Mix.		
1030	0	0
1035	18	10
1039	30	20
1042	38	30
1045	47	40
1050	57	50
1056	67	60
1066	75	70
1069		80
1066	80	
1073		90
1068	90	
1065	100	100

B = $Nd_2(MoO_4)_3$ (275)

t, °C	M	% B
Mix.		
1176	0	0
1161	10	20
1146	23	35
1126	42	50
1112	53	60
1096	64	70
1083	74	80
1074	83	90
1065	100	100

B = $(NdPr)_2(MoO_4)_3$ (274)

t, °C	M	% A
Mix.		
1125–**1144**	0	0
1133		20
1127		30
1120	(3)	40
1112	(8)	50
1102	(18)	60
1091	(31)	70
1082	(53)	80
1075	(65)	90
1065	100	100

$PbWO_4$

B = $Ce_2(WO_4)_3$ (274)

t, °C	M	% B
Mix.		
1089	0	0
1093	(28)	10
1097	(60)	20
1101	(72)	30
1106	(81)	40
1112	(90)	50
1115	(93)	60
1119	(96)	70
1121	(98)	80
1123	(99)	90
1125	100	100

$3Pb_3(VO_4)_2.PbF_2$

B = $3Pb_3(VO_4)_2$.-$PbCl_2$ (16) (A.)

t, °C	M % B
Mix.	
916	0
942	24.78
964	49.70
978	74.78
990	100

TlCl

B = TlBr (162)

t, °C	M % B
Mix. + liq.	
426	0
422	10
418	20
415	30
413	40
415	50
420	60
426	70
434	80
442	90
450	100

B = TlI (162)

t, °C	M	% B
Mix_1		
426 ↓	0	0
330 ↓	(1.5)	40
$Mix_1 + Mix_2$		
316E {	2	47
	83	47
Mix_2		
338 ↓	(86)	60
431 ↓	100	100

B = $ZnCl_2$ (137)

t, °C	M	% B
A		
435		0
403		10
A + A_2B		
335E		23
A_2B		
352		33.3
332		40
235		50
$A_2B + AB_2$		
193E		52
AB_2		
219		60
226		66.7
AB_2 + Mix.		
215E	95	70
Mix.		
260	98	80
271	99	90
275	100	100

B = $CdCl_2$ (137, 229)

t, °C	M % B
A	
429	0
382	10
334	20
A + AB	
298E	28.5
AB	
316	30
390	40
426	50
419	60
AB + B	
400E	65.5
B	
424	70
478	80
527	90
568	100

B = $HgCl_2$ (229)

t, °C	M	% B
A		
429		0
374		10
294		20
A + A_4B		
250U		23
A_4B		
222		30
$A_4B + Mix_1$		
201E	43	32.5
Mix_1		
220	(48)	40
AB		
225		50
Mix_2		
200	(52)	60
$Mix_2 + Mix_3$		
183E {	(53)	64
	76	64

B = $HgCl_2$.—(*Continued*)

t, °C	M	% B
Mix_3		
209	81	70
241	90	80
262	96	90
275	100	100

k_B = 35.0 (0.06) (27) (A.).

B = CuCl (229)

t, °C	M	% B
Mix_1		
429	0	0
390	(2)	10
350	(3)	20
305	(5)	30
260	(6)	40
$Mix_1 + A_2B$		
225U {	7	47.5
	33.3	47.5
Mix_2		
215	(34)	50
178	(35)	55
Mix_2 + B		
124E	37	61.5
B		
242		70
310		80
362		90
422		100

B = AgCl (229)

t, °C	M % A
B	
454	0
461	10
362	20
298	30
220	40
B + B_2A_3	
210E	42
B_2A_3	
236	50
B_2A_3 + A	
253UE	60
A	
316	70
360	80
396	90
429	100

B = $FeCl_3$ (233)

t, °C	M % B
A	
429	0
397	10
335	20
A + A_2B	
262E	26.5
A_2B	
280	30
290	33.3
A_2B + B (?)	
220E	38
B (?)	
255	45
286	55
300	62

B = $AlCl_3$ (130) (A.) M. c. t.

t, °C	M % A
B	
190.2	0
189.4	0.52
B_xA	
189.4	0.9
192.0	1.2*
192.0	14.7
190.2	15.6
182.3	18.7
172.8	21.8
158.8	26.1
B_2A	
160.5	28.2
162.9	29.2
BA	
172.6	31.4
196.6	33.1
211.4	34.2
248.1	37.9
274.1	42.1
290.0	46.2
297.0	50.0
295.5	51.2
288.1	53.5
A	
325.0	55.5
360.0	56.5

* Two liq. layers from 1.2 to 14.7.

B = $BeCl_2$ (280)

B = $MgCl_2$ (137)

t, °C	M % B
A	
436	0
418	10
388	20
A + AB_2	
361E	26
AB_2	
425	35
485	50
AB_2 + B	
498U	63
B	
550	70
625	80
677	90
718	100

B = $CaCl_2$ (137)

t, °C	M % B
A	
435	0
A + AB	
419E	7
AB	
565	15
674	35
683	50
667	60
AB + B	
648E	67

B = $CaCl_2$.—(*Continued*)

t, °C	M % B
B	
665	70
715	80
753	90
782	100

B = $SrCl_2$ (137)

t, °C	M % B
A	
435	0
A + AB	
416E	11.5
AB	
475	20
530	30
563	40
AB + B	
568U	47
B	
660	60
720	70
798	85
872	100

B = $BaCl_2$ (137)

t, °C	M % B
A	
435	0
A + B	
430E	<1
B(β)	
590	10
670	20
730	30
825	50
905	70
B(β) + B(α)	
925	76
B(α)	
940	80
955	90
962	100

B = LiCl (229)

t, °C	M % A
B	
602 ↓	0
352 ↓	60
B + A	
342E	62.5
A	
370	70
415	90
429	100

B = NaCl (229)

t, °C	M % A
B	
805	0
765	10
715	25
673	40
640	50
565	65
495	75
B + A	
412E	85
A	
423	90
429	100

TlCl.—(*Cont'd*)

B = KCl (229)

t, °C	M % A	
Mix.		
776	0	0
747	(6)	10
715	(11)	20
652	(23)	40
618	(30)	50
583	(37)	60
545	(46)	70
508	(55)	80
470	(65)	90
449	73	95
429	100	100

B = RbCl (229)

Mix.		
716	0	0
685	(3)	10
660	(6)	20
635	(8)	30
605	(12)	40
570	(16)	50
530	(23)	60
490	(31)	70
460	(40)	80
438	(52)	90
432	65	95
429	100	100

B = CsCl (229)

Mix_1		
639	0	0
595	(5)	10
557	(8)	20
532	(10)	30
500	(11)	40
$Mix_1 + Mix_2$		
466U	12	43.5
	(20)	43.5
Mix_2		
450	(24)	50
410	(43)	60
393	60	70
$Mix_2 + Mix_3$		
390	75	75
Mix_3		
400	90	80
418	97	90
429	100	100
Solid state		
B(α) + B(β)		
450	0	
460	10–(17)	
466	12–(20)	

TlBr

B = TlI (162)

t, °C	M % B
Mix. + liq.	
450	0
441	10
430	20
421	30
415	40
412	50

B = TlI.—(*Continued*)

t, °C	M % B
Mix. + liq.	
411	60
413	70
417	80
424	90
431	100

B = $HgBr_2$ (98) (A.)

t, °C	M % A
B	
235.0	0
233.3	2.08
232.1	3.70
230.9	4.92

k_B = 28.3 (0.14).

B = $AlBr_3$ (130) (A.)

M. c. t.

B	
97.1	0
B_xA	
103.9	0.6*
103.9	22.8
99.9	24.4
B_2A	
104.4	24.4
105.9	26.0
108.1	28.4
111.8	32.7
112.0	33.3
BA	
126.8	35.4
142.1	37.6
160.4	40.7
192.9	46.3
203.4	48.2
210.0	50.0
217.9	51.0
200.8	52.1
193.1	53.3
A	
213.8	55.0
215.9	55.2

* Two liq. layers from 0.6 to 22.8.

TlI

B = $TlNO_3$ (71)

t, °C	M % B	
Mix_1		
422	0	0
406	4	10
392	7.5	20
376	11.5	30
360	15	40
342	19.5	50
322	24	60
296	28	70
266	32	80
$Mix_1 + Mix_2$		
215U	36	90
	81	90
Mix_2		
208	87	95
206	100	100

Tl_2S

B = Ag_2S (115)

t, °C	M % A
B	
781	0
610	10
495	20
B + B_4A	
358U	29
B_4A	
326	35
B_4A + A	
308E	37.5
A	
319	40
358	50
385	60
405	70
422	80
436	90
448	100

$TlNO_2$

B = $TlNO_3$ (67); *v.* Fig. 19

Mix.		
206	0	0
202	2	10
199	5	20
195	8	30
191	12	40
185	19	50
175	37	60
167	50	70
161	60	80
156	68	90
146	90	
149	100	100
Solid state		
B(α) + B(β)		
143	0	
106	5–7	
A(α) + B(β)		
112	81–90	
120	92–95	
131	100	

$TlNO_3$

B = $AgNO_3$ (70) (A.)

t, °C	M % B
A(α)	
206	0
180	10
153	20
A(α) + A(β)	
142	25
A(β)	
129	30
105	40
A(β) + AB	
81E	47.5
AB	
83	50
AB + B(β)	
81E	53
B(β)	
109	60
140	70

B = $AgNO_3$.—(*Continued*)

t, °C	M % B
B(β) + B(α)	
159	77.5
B(α)	
166	80
189	90
208	100
Solid state	
A(β) + A(γ)	
79	0– 50
AB(α) + AB(β)	
26	0–100

B = $NaNO_3$ (70)

A(α)	
206	0
A(α) + B	
162E	20.5
B	
182↓	30
240↓	60
265	75
278	85
308	100
Solid state	
A(α) + A(β)	
142	0–100
A(β) + A(γ)	
79	0–100

B = KNO_3 (70)

v. Fig. 20

ZnF_2

B = NaF (205) (A.)

t, °C	M % A
B	
1040	0
983	5.5
940	13.5
905	23.0
B + (?)	
660, 680 E	(?)
A	
872	100

$ZnCl_2$

B = $CdCl_2$ (110)

B	
568	0
553	15
473	55
390	75
305	90
B + A	
262E	>99
A	
262	100

B = CuCl (110)

Mix_1		
424	0	0
400	(3)	15
382	(5)	25
330	(10)	50
283	(13)	70

B = CuCl.—(*Continued*)

t, °C	M % A	
$Mix_1 + Mix_2$		
242E	14	87
	95	87
Mix_2		
248	(96)	90
261	100	100

B = $FeCl_3$ (110)

B	
298	0
288	10
268	30
245	50
B + A	
214E	73
A	
245	90
261	100

B = $MnCl_2$ (229)

t, °C	M % B
A	
275	0
A + B	
275E	<1
B	
330	10
380	20
420	30
460	40
495	50
530	60
560	70
590	80
620	90
650	100

B = $MgCl_2$ (159)

t, °C	M % A
B	
711	0
695	10
655	30
545	70
485	85
405	95
B + A	
271E	>99
A	
271	100

B = $CaCl_2$ (159)

B	
777	0
745	10
710	20
670	30
635	40
590	50
550	60
500	70
450	80
385	90
B + A	
274E	(100)
A	
274	100

B = $SrCl_2$ (229)

t, °C	M % B
A	
275	0
A + AB	
275	<1
AB	
360	10
425	20
460	30
AB + B	
476U	46
B	
600	60
675	70
745	80
872	100

B = $BaCl_2$ (229)

A	
275	0
A + AB	
275	<1
AB	
385	10
435	20
460	30
AB + B(β)	
470U	45
B(β)	
550	50
660	60
750	70
825	80
895	90
B(β) + B(α)	
923	94
B(α)	
960	100

$ZnBr_2$

B = $AlBr_3$ (117, 130) (A.)

M. c. t.

t, °C	M % A
B	
93.0	0
89.4	3.46
87.9	5.05
82.1	9.49
97.1	0
94.4	5.6
87.6	11.3
83.5m	14.5
B_2A	
95.1	11.3
99.3	14.5
104.1	20.6
110.4	30.0
111.5	33.3
110.6	35.1

k_B = 25.6 (0.39).

ZnS

B = Cu_2S (81)

v. Fig. 21

B = Ag_2S (81)

t, °C	Wt. % A
B	
843	0
B + A	
800E	3
A	
1035	10
1195	20
1295	30
1358	40
1412	50
1460	60
1515	70
1575	80

B = FeS (81)

B	
1188	0
B + A	
1180E	6
A	
1270	10
1410	20
1510	40
1550	80

$Zn(CN)_2$

B = KCN (256)

t, °C	M % B
A* + AB_2	
515E	52
AB_2	
530	60
538	66.7
515	75
AB_2 + B	
487E	80
B	
574	90
622	100

* Under 50 M % B, A decomposes.

CdO

B = B_2O_3 (156) (A.)

(?)	
940	30.30
905	37.95
810	44.00
(?) + AB	
750E	46.65
AB	
845	48.60
850	50.25
810	51.60
770	52.40
AB + A_2B_3	
710E	55.50
A_2B_3	
750	57.25
810	58.05
855	60.30
755	63.80

CdF_2

B = CdI_2 (219) (A.)

t, °C	M % B
(?)	
>**1000**	0
340*	90
350	100

* Minimum t_L.

B = NaF (205)

t, °C	M % A
B	
1040	0
990	10
955	15
880	25
785	35
B + A	
660E	46
A	
750	55
885	70
1040	90
1110	100

k_B = 18.9 (0.37) (A.).

$CdCl_2$

B = $CdBr_2$ (167)

Mix. + liq.	
567	0
558	10
553	20
552	30
550.5	40
551	50
552	60
554	70
556	80
559	90
563	100

B = CdI_2 (167)

t, °C	M % A	
Mix_1		
385	0	0
368	(1.5) ↓	20 ↓
Mix_1 + Mix_2		
359E	(2)	30
	(96)	30
Mix_2		
386	(96.5)	40
563	100 ↓	100 ↓

B = $CdSO_4$ (219) (A.)

t, °C	M % B
(?)	
590	0
565*	15
1000	100

* Minimum t_L.

B = CuCl (110)

t, °C	M % A	
Mix_1		
424	0	0
415	5	10
Mix_1 + Mix_2		
410	14	14

B = CuCl.—(*Continued*)

t, °C	M % A	
Mix_2		
422	33	20
437	44	30
451	53	40
467	63	50
486	72	60
507	81	70
525	87	80
544	93	90
568	100	100
Solid state		
Mix. + AB_4		
305	10	
350	20	
325	35	
315	50	

B = $MnCl_2$ (229)

Mix.		
650	0	0
638	6	10
628	12	20
618	18	30
608	25	40
598	32	50
590	40	60
583	49	70
576	63	80
571	77	90
568	100	100

B = $BeCl_2$ (280)

B = $MgCl_2$ (159)

Mix.		
711	0	0
695	5	10
680	11	20
665	17	30
648	24	40
630	(31)	50
613	(38)	60
597	(47)	70
583	59	80
573	73	90
563	100	100

B = $CaCl_2$ (229)

Mix_1		
772	0	0
748	(6)	10
720	(13)	20
683	(23)	30
650	(33)	40
618	(43)	50
590	(53)	60
565	64	70
550	75	80
Mix_1 + Mix_2		
545	85	85
Mix_2		
550	95	90
568	100	100

B = $SrCl_2$ (229)

t, °C	M % A
B	
872	0
800	10
730	20
660	30
590	40
540	50
B + A	
503E	60
A	
515	70
530	80
550	90
568	100

B = $BaCl_2$ (229)

B(α)	
960	0
B(α) + B(β)	
923	4
B(β)	
895	10
830	20
745	30
650	40
543	50
B(β) + A	
450E	58
A	
455	60
490	70
520	80
545	90
568	100

B = NaCl (42)

t, °C	M % B
A	
562	0
535	10
505	20
463	30
417	40
A + AB_2	
392E	45
AB_2	
407	50
AB_2 + B	
423U	57
B	
485	60
610	70
695	80
755	90
798	100

B = KCl (42)

A	
562	0
550	10
498	20
418	30
A + AB	
383E	33

B = KCl.—(*Cont'd*)

t, °C	M % B
AB	
415	40
431	50
410	60
AB + AB_4	
390E	63
AB_4 + B	
461U	68.5
B	
560	75
625	80
720	90
774	100

$CdBr_2$

B = CdI_2 (167)

Mix.		
567	0	0
545	(5)	10
520	(11)	20
495	(18)	30
470	(27)	40
450	(37)	50
430	(49)	60
410	(65)	70
400	(76)	80
390		90
385.5		100

B = CuBr (110)

t, °C	M % A	
Mix.		
484	0	0
460	5	10
440	14	20
431	20	30
428	22	40
420	50	50
Mix. + A(α)		
420E	50	
A(α)		
465	60	
498	70	
523	80	
547	90	
568	100	
Solid state		
A(α) + A(β)		
394	0	
366	10	
355	20	
350	30	
350	60	
346	70	
344	85	

B = $AlBr_3$ (130) (A.)

M. c. t.

B	
97.1	0
95.6	0.7
B_2A	
140.7	1.1
168.1	1.8
189.6	4.5

B = $AlBr_3$.—(*Continued*)

t, °C	M % A
B_2A	
192.9	9.0
197.0	13.0
204.2	19.3
217.4	26.0
224.0	33.1
224.0	33.3
223.1	35.3
A	
234.9	35.3

B = NaBr (44)

t, °C	M % B
A	
567	0
545	10
518	20
485	30
440	40
388	50
A + B	
367E	54
B	
455	60
550	70
630	80
695	90
746	100

B = KBr (44)

A	
567	0
540	10
505	20
460	30
395	40
A + AB	
345E	45.5
AB	
354	50
348	55
330	60
AB + AB_4	
304E	62
AB_4 + B	
324U	68.5
B	
440	70
600	80
675	90
735	100

CdI_2

B = CuI (110)

t, °C	M % A	
Mix_1		
606	0	0
570	4	10
475	24	35
413	47	55
Mix_1 + Mix_2		
350	81.5	81.5
Mix_2		
363	95	90
392	100	100

CdI_2.—(Continued)

B = CuI.—(Continued)

t, °C	M % A
Solid state B(α) + B(β)	
414	0
385	10
290	35
270	55
265	80

B = HgI_2 (229)

t, °C	M % B
Mix.	
380	0
365	10
348	20
335	30
323	40
315	50
309	60
300	70
290	80
273	90
253	100
Solid state B(α) + B(β)	
105	70
118	80
125	90
128	100

B = NaI (43)

t, °C	M % B
A	
385	0
375	10
357	20
335	30
308	40
A + B	
287E	48
B	
308	50
417	60
505	70
570	80
620	90
653	100

B = KI (43)

t, °C	M % B
A	
385	0
370	10
350	20
323	30
280	40
A + AB_2(β)	
185E	48
AB_2(β)	
205	50
AB_2(β) + AB_2(α)	
214	51
AB_2(α) + B	
270U	58.5

B = KI.—(Cont'd)

t, °C	M % B
B	
300	60
450	70
555	80
630	90
678	100

$CdSO_4$

B = Li_2SO_4 (54)

t, °C	M % A
B(α)	
856	0
768	10
663	20
B(α) + B(β)	
570	28
B(β) + A	
551E	31.5
A*	
595	40
665	50
750	60
860	75
1000	100
Solid state B(α) + B(β)	
585	0
570	5–28

* At 820° probable transition A(α) → A(β).

B = Na_2SO_4 (54)

t, °C	M % A	
Mix.		
1066	0	0
1050	(6)	10
960	(13)	20
860	(22)	30
730	(31)	40
Mix. + BA_2		
653E	35	45.5
BA_2		
673		50
745		60
BA_2 + BA_3		
763U		62.5
BA_3		
778		65
798		70
BA_3 + A		
813UE		75
A*		
840		80
945		90
1000		100
Solid state B(α) + B(β)		
590		0
523		9–66
Mix. + BA_2		
600		27
550		18

* A(α) → A(β) probable at 820°.

B = K_2SO_4 (54)
v. Fig. 22

HgCl*

B = $HgCl_2$ (30) (A.)

t, °C	M % A
B	
265.0	0
264.2	0.62
263.8	0.96
263.4	1.22

* 2HgCl ⇄ Hg_2Cl_2 in solution in B.

$HgCl_2$

B = $HgBr_2$ (170)

t, °C	M % B
Mix. + liq.	
265	0
248	10
235	20
226	30
220	40
216	50
213	60
212	70
215	80
219	90
222	100

B = HgI_2 (184)
v. Fig. 23

B = CuCl (30) (A.)

t, °C	M % B
A	
265.0	0
264.3	0.59
263.8	1.16
263.3	2.06

B = AgI (33) (A.)

B = $AlCl_3$ (130) (A.)
M. c. t.

t, °C	M % A
B	
190.2	0
189.7	7.7
189.0	18.5
184.6	26.4
167.5	37.4
157.4	41.4
A	
151.3	48.2
192.0	55.9
216.2	63.2
238.1	70.9
259.7	82.6
272.1	90.0

B = NaCl (30) (A.)

t, °C	M % B
A	
265.0	0
264.4	0.43
264.1	0.62
263.8	0.85

k_A = 34.5 (0.03).

B = KCl (30) (A.)

t, °C	M % B
A	
265.0	0
264.5	0.40
264.3	0.58
263.8	1.04

k_A = 32.4 (0.04).

B = RbCl (30) (A.)

t, °C	M % B
A	
265.0	0
263.2	1.24
262.4	1.86
261.6	2.54

k_A = 36.2 (1.0).

B = CsCl (30) (A.)

t, °C	M % B
A	
265.0	0
263.6	0.99
263.0	1.43
262.5	1.79

k_A = 36.8 (0.07).

HgBr*

B = $HgBr_2$ (30, 98) (A.)

t, °C	M % A
B	
235.0	0
234.2	0.70
233.3	1.54
232.9	1.94

B = $AlBr_3$ (130) (A.)

t, °C	M % A
B	
97.1	0
96.6	0.6
BA	
161.5	1.2
225.4	1.7
238.1	1.8†
238.1	30.8
242.1	33.9
250.1	40.5
259.7	48.6
261.0	50.0
256.6	53.2
252.9	54.7
241.4	59.6
A	
243.7	62.7
281.3	66.1

* 2HgBr ⇄ Hg_2Br_2 in solution in B.
† Two liq. layers from 1.8 to 30.8.

$HgBr_2$

B = HgI_2 (170, 214)

t, °C	M % B	
Mix_1		
236.5	0	0
229	(7)	10
222	(15)	20
218	(25)	30

B = HgI_2.—(Cont'd)

t, °C	M % B	
Mix_1 + Mix_2		
216.1	40	40
Mix_2		
217	(55)	50
221	(66)	60
227	(75)	70
235	(83)	80
245	(92)	90
254.4	100	100
Solid state B(α) + B(β)		
50	70–(83)	
80	81–(89)	
100	88–(93)	
127	100	

B = $AlBr_3$ (118)

t, °C	M % A
B	
97.4	0
B + B_2A	
(93)E	(7)
B_2A	
96.5	14.9
100.3	24.0
102.8	33.3
B_2A + A	
100.5E	38.2
A	
142.2	50.8
184.0	63.6
209.4	76.7
227.3	90.7
241.6	100

B = AgBr (98) (A.)

t, °C	M % B
A	
235.0	0
233.3	2.13
230.6	4.44
226.4	8.56

k_A = 32.0 (0).

B = $AlBr_3$ (130) (A.)
M. c. t.

t, °C		M % A
B		
97.1		0
95.8		1.4
B_2A(α) (β)		
(α)*	(β)†	
94.3		3.8
	93.5	4.6
95.9	94.7	7.1
100.1	99.1	17.9
102.8	101.9	25.8
103.6	102.5	28.7
	102.6	32.2
103.9		32.8
103.9	**102.8**	33.3
103.1		37.7
101.9	100.7	40.3
A		
118.8		44.2
123.2		45.2
145.5		49.4

B = $AlBr_3$.—(Continued)

t, °C	M % A
A	
175.0	59.6
206.8	75.7
224.4	88.0
239.1	98.1
241.5	100

* Stable form.
† Metastable form.

B = KBr (98) (A.)

t, °C	M % B
A	
235.0	0
232.4	2.82
229.8	5.44
228.0	7.29

k_A = 32.2 (0.22).

HgI

B = HgI_2 (30, 31, 98) (A.)

t, °C	M % A
B	
250.0	0
246.3	3.11
242.6	6.04

k_B = 54.0 (0).

HgI_2

B = AgI (246)

t, °C	M % B	
Mix_1		
257	0	0
248	2.5	10
Mix_1 + Mix_2		
242E	7	13
	19	13
Mix_2		
263	29	20
299	45	30
330	56	40
360	66.5	50
394	75	60
425	82	70
458	89	80
490	94.5	90
526	100	100

B = AgI (97) (A.)

t, °C	M % B
A	
250.0	0
246.4	2.02
243.2	6.23
238.5	10.94

k_A = 53.0 (0).

B = KI (97) (A.)

t, °C	M % B
A	
250.0	0
247.2	2.13
246.9	4.06
242.8	5.53
237.7	7.20

k_A = 53.5 (0).

CuO

B = CuCl (256)

t, °C	M % A
A	
424	0
A + B	
424E	<1
B	
625	20
715	30
800	40
1055	75
1230	100

CuCl

B = $CuCl_2$ (225)

t, °C	M % B	
Mix.		
422	0	0
413	2	5
398	3	10
Mix. + B		
378E	4	13
B		
402		15
432		20
465		33

Above 465° B decomposes.

B = CuBr (162)

t, °C	M % B
Mix.	
419	0
411	10
408	20
408	30
410	40
417	50
425	60
437	70
450	80
465	90
480	100
Solid state	
A(α) + A(β)	
372	70
377	80
380	90
384	100

B = CuI (162)

t, °C	M % B	
A		
419		0
385		10
352		20
320		30
292		40
A + Mix.		
284E	86	43
Mix.		
320	88	50
375	90	60
428	93	70
482	95	80
535	98	90
590	100	100

B = CuI.—(*Cont'd*)

t, °C	M % B
Solid state	
B(α) + B(β)	
214	0–92
400	100

B = Cu_2S (256)

t, °C	M % B
A	
423	0
410	10
A + B	
391E	17
B	
539	30
638	40
815	60
895	70
972	80
1048	90
1114	100

B = AgCl (229)

t, °C	M % A	
Mix_1		
455	0	0
425	(3)	10
392	(5)	20
355	(7)	30
318	(9)	40
279	(10)	50
$Mix_1 + Mix_2$		
260E	(10)	54.5
	90	54.5
Mix_2		
282	91	60
320	92	70
355	94	80
388	96.5	90
422	100	100

B = $FeCl_3$ (110)

t, °C	M % B
A	
424	0
390	10
361	20
332	30
A + AB	
304E	40
AB	
320	50
318	60
305	70
285	80
AB + B	
263E	88
B	
298	100

B = $AlCl_3$ (130) (A.)

M. c. t.

t, °C	M % A
B	
190.2	0
190.0	10.5
187.4	19.7
175.3	30.8

B = $AlCl_3$.—(*Continued*)

t, °C	M % A
BA	
178.3	32.2
209.9	40.6
231.9	48.1
233.0	50.0
231.9	50.9
225.9	54.0
A	
227.4	57.4
252.5	60.1
291.5	62.0

B = $MgCl_2$ (159)

t, °C	M % A
B	
711	0
701	5
658	30
618	50
567	70
493	90
B + A	
408E	99
A	
418	100

B = $CaCl_2$ (159)

t, °C	M % A
B	
777	0
750	10
720	30
690	50
635	70
B + A	
400E	90
A	
418	100

B = LiCl (137, 229)

t, °C	M % A	
Mix_1		
602	0	0
574	7	10
546	13	20
513	19	30
480	24	40
438	26	55
$Mix_1 + Mix_2$		
424U	27	62
	50	62
Mix_2		
415	59	70
408		80
412		90
422	100	100

B = NaCl (61, 137, 202, 229)

t, °C	M % A	
Mix_1		
806	0	0
772	(2)	10
727	(4)	20
673	(6)	30
610	(9)	40
540	(11)	50
460	(13)	60
370	(14)	70

B = NaCl.—(*Continued*)

t, °C	M % A	
$Mix_1 + Mix_2$		
316E	15	75
	88	75
Mix_2		
335	(90)	80
378	(95)	90
422	100	100

k_B = 20.8 (1.0) (187) (A.).

B = KCl (61, 137, 202, 229)

t, °C	M % A
B	
776	0
733	10
671	20
583	30
480	40
335	50
$B + B_2A$	
224U	53
B_2A	
204	60
$B_2A + A$	
136E	68
A	
167	70
280	80
360	90
422	100

k_B = 28.9 (1.1) (187) (A.).

B = RbCl (229)

t, °C	M % A
B	
716	0
663	10
605	20
515	30
410	40
275	50
$B + B_2A(\alpha)$	
250U	51.5
$B_2A(\alpha) + B_2A_3$	
180UE	60
$B_2A_3 + A$	
148E	68
A	
175	70
285	80
368	90
422	100
Solid state	
$B_2A(\alpha) + B_2A(\beta)$	
105	20–45

B = CsCl (229)

t, °C	M % A
B(α)	
639	0
597	10
540	20
B(α) + B(β)	
450	27
B(β)	
430	30
350	40

B = CsCl.—(*Continued*)

t, °C	M % A
$B(\beta) + B_3A_2$	
320U	43
B_3A_2	
276	50
$B_3A_2 + BA_2$	
236E	54.5
BA_2	
260	60
274	66.7
248	75
$BA_2 + A$	
216E	77.5
A	
260	80
355	90
422	100

CuBr

B = CuI (162)

t, °C	M % B
Mix.	
480	0
460	10
450	20
442	30
447	40
460	50
480	60
502	70
530	80
560	90
590	100
Solid state	
B(α) + B(β)	
384	1
375	10
368	20
363	30
360	40
357	50
359	60
363	70
372	80
383	90
400	100

B = KBr (62)

t, °C	M % B
A	
478	0
423	10
338	20
210	30
$A + AB_2$	
182E	32
$AB_2 + B$	
234U	36
B	
293	40
408	50
507	60
592	70
653	80
698	90
730	100

CuI

B = AgI (209)

t, °C	M % B	
Mix_1		
602	0	0
563	6	10
536	13.5	20
515	22	30
500	32	40
$Mix_1 + Mix_2$		
490E	50	50
Mix_2		
495	70	60
505	80	70
517	86	80
535	94	90
557	100	100
Solid state		
Unmixing		
402	0	0
372	5.5	10
349	12	20
333	20	30
317	29	40
298		50
282		60
268		70
243		80
205		90
147	100	

Cu_2S

B = Ag_2S (80)

t, °C	Wt. % A
Mix. + liq.	
835	0
750	10
700	20
677	30
688	40
724	50
792	60
875	70
963	80
1045	90
1121	100

B = Ni_2S (84)

t, °C	Wt. % B
A	
1125	0
1050	10
1000	20
975	30
965	40
935	50
890	60
810	70
720	80
610	90
A + B	
575E	92.5
B	
610	95
645	100

Cu_2S.—(*Continued*)

B = Ni_2S.—(*Continued*)

t, °C	Wt. % B
Solid state	
B(α) + B(β)	
530	0–100

B = Ni_3S_2 (84, 108)

t, °C	Wt. % B
A	
1125	0
1055	10
995	20
960	30
935	40
915	50
880	60
835	70
785	80
A + B	
725E	90
B	
760	95
790	100
Solid state	
B(α) + B(β)	
545	0–100

B = Na_2S (84)

t, °C	M % A
B	
920	0
770	10
655	20
555	30
B + AB	
505E	35
AB	
620	40
700	50
675	55
AB + A	
595E	59
A	
660	70
775	80
1125	100

$Cu_2(CN)_2$

B = NaCN (256)

t, °C	M % B	
A		
473	0	
402	30	
352	40	
A + AB_2		
345E	41.5	
AB_2		
370	50	
390	60	
398	66.7	
387	70	
AB_2 + AB_4		
368E	75.5	
AB_4 + AB_6		
372UE	80	
AB_6 + Mix.		
406UE	85.7	
Mix.		
476	95	90
520	98	95
562	100	100

AB_3 forms at 318° in range, 66.7–80 M %.

B = KCN (256)

t, °C	M % B
A	
473	0
440	15
306	35
A + AB	
280E	39.5
AB	
327	50
AB + AB_2	
324E	56
AB_2	
327	66.7
312	70
AB_2 + AB_6	
277E	74
AB_6	
384	80
AB_6 + B	
398UE	85.7
B	
500	90
622	100

Solid state A_3B_2 forms at 230° over M = 0–50. AB_3 forms at 228° over M = 66.7–85.7.

AgCl

B = AgBr (162)

t, °C	M % B
Mix. + liq.	
452	0
443	10
434	20
427	30
420	40
416	50
413	60
412	65
413	70
415	80
418	90
422	100

B = AgI (162)

t, °C	M % B	
A		
452	0	
418	10	
380	20	
340	30	
295	40	
245	50	
A + Mix.		
211E	56.1	
Mix.		
250	(88)	60
350	(91)	70
435	(94)	80
495	(97)	90
552	100	100
Solid state		
B(α) + B(β)		
115	0–88	
125	92–94	
143	100	

B = Ag_2S (226, 256)

t, °C	M % B
A	
456	0
427	10
403	20
388	30
A + B(α)	
380E	35.3
B(α)	
404	40
480	50
565	60
635	70
695	80
750	90
836	100
Solid state	
B(α) + B(β)	
178	100

B = $AgNO_3$ (126, 234)

t, °C	M % B	
A		
454	0	
426	10	
395	20	
358	30	
319	40	
278	50	
235	60	
190	70	
A + Mix.		
160E	76.7	
Mix.		
170	95	80
195	98	90
210	100	100
Solid state		
B(α) + B(β)		
85	0–93	
105	95–97	
155	100	

k_B = 26.5 (1.0) (109) (A.).

B = $AlCl_3$ (130) (A.)

t, °C	M % A
B	
190.2	0
B_xA	
191.2	0.4
192.9	0.7*
192.9	17.6
190.1	20.1
184.5	26.5
156.0	33.4
136.8	38.0
121.9	39.7
BA	
122.2	39.9
138.9	43.6
147.5	47.0
A	
175.4	47.9
285.3	49.1
378.0	50.8

* Two liq. layers from 0.7 to 17.6.

B = $BeCl_2$ (280)

B = $MgCl_2$ (144)

t, °C	M % A
B	
711	0
688	10
665	20
642	30
616	40
589	50
558	60
524	70
486	80
B + A	
452E	87.5
A	
455	100

B = $CaCl_2$ (144)

t, °C	M % A
B	
777	0
732	10
700	20
680	30
668	40
650	50
618	60
563	70
470	80
B + A	
450E	81.3
A	
453	90
455	100

B = LiCl (229)

t, °C	M % A	
Mix_1		
602	0	0
581	4.7	10
561	8	20
542	10.5	30
525	12.5	40
509	14.5	50
493	16	60
474	17	70
Mix_1 + Mix_2		
469U	18	72
	50	72
Mix_2		
466	54	75
463	60	80
458	72	90
455	100	100

B = NaCl (39, 229, 279)

t, °C	M % A	
Mix.		
806	0	0
775	4.6	10
743	10	20
710	15.3	30
675	21.5	40
637	28.5	50
598	36	60
561	43.5	70
524	52	80
488	62	90
472	73	95
455	100	100

B = KCl (277)

t, °C	M % B
A	
451	0
408	10
361	20
335	25
A + B	
306E	30.5
B	
405	40
490	50
560	60
622	70
679	80
735	90
790	100

k_B = 27.7 (0.63) (187) (A.).

B = RbCl (229)

t, °C	M % A
B	
715	0
680	10
630	20
560	30
475	40
370	50
B + A	
253E	60
A	
325	70
375	80
415	90
455	100

B = CsCl (229)

t, °C	M % A
B(α)	
639	0
603	10
550	20
473	30
B(α) + B(β)	
450U	32
B(β)	
400	40
320	50
B(β) + AB	
310U	51
AB	
298	60
267	70
AB + A	
258E	72
A	
355	80
413	90
455	100

$AgClO_3$

B = $NaClO_3$ (78) (A.)

t, °C	M % B
Mix. (?)	
255.0	0
254.1	2.81
253.3	5.46
251.7	10.32
251.0	12.62

AgBr

B = AgI (162)

t, °C	M % B
Mix. + liq.	
422	0
398	10
383	20
378	30
388	40
409	50
434	60
462	70
490	80
520	90
552	100
Solid state	
B(α) + B(β)	
96	70–(84)
103	80–(87)
116	90–(94)
143	100

B = $AgNO_3$ (126, 234)

t, °C	M % B	
A		
420	0	
380	10	
340	20	
300	30	
257	40	
211	50	
A + AB		
188U	54.5	
AB		
186	60	
171	70	
AB + Mix.		
155E	76	
Mix.		
167	96	80
193	98	90
210	100	100

B = $AgNO_3$.—(Continued)

t, °C	M % B
Solid state	
B(α) + B(β)	
80	50–96
115	98
155	100

k_B = 27.3 (0.83) (109) (A.).

B = $AlBr_3$ (130) (A.)

M. e. t.

t, °C	M % A
B	
97.1	0
94.2	1.1
93.4	1.3
B_2A	
95.3	1.5
98.2	1.6
105.9	2.2*
105.9	17.0
108.6	18.7
111.3	20.7
115.6	25.6
117.8	27.8
BA	
125.2	30.2
154.6	35.6
182.3	40.9
206.8	46.8
215.6	50.0
210.3	52.0
A	
319.0	54.9

* Two liq. layers from 2.2 to 17.0.

B = LiBr (231)

t, °C	M % A	
Mix.		
556	0	0
520	9	14
490	18.5	27.5
470	27.3	40
460	33	49
450	40	59
440	49	71
430	62	83.5
420	90	99
419	100	100

B = NaBr (231, 279)

Mix.		
748	0	0
713	(2)	10
673	(6)	20
633	(10)	30
598	(15)	40
560	(19)	50
518	(26)	60
479	(34)	70
443	48	80
425	68	87
419	100	100

B = KBr (231, 279)

t, °C	M % A
B	
742	0
692	10
633	20
567	30
485	40
367	50
B + A	
290E	55.5
A	
302	60
328	70
357	80
388	90
419	100

B = RbBr (231)

B	
670	0
645	10
598	20
536	30
452	40
335	50
B + AB_2 (?)	
270U	54.2
AB_2 (?)	
255	60
AB_2 (?) + A	
228E	68
A	
245	70
320	80
375	90
419	100

AgI

B = $AgNO_3$ (234)

v. also Fig. 24

t, °C	M % B	
A(α)		
548	0	
Mix_1		
470	(2)	10
370	(3)	20
260	(4)	30
135	(5)	40

B = LiI (231)

t, °C	M % A
Mix. + liq.	
450	0
430	10
422	20
438	30
462	40
480	50
497	60
512	70
525	80
537	90
546	100

B = LiI.—(Cont'd)

t, °C	M % A
Solid state	
A(α) + A(β)	
418	20
403	30
380	40
350	50
315	60
277	70
237	80
194	90
145	100

B = NaI (231)

B	
662	0
640	10
598	20
558	30
515	40
471	50
421	60
B + A(α)	
390E	65.5
A(α)	
402	70
430	80
488	90
546	100
Solid state	
A(α) + A(β)	
145	0–100

B = KI (228)

B	
680	0
648	10
602	20
540	30
463	40
373	50
265	60
B + A_2B (?)	
245E	61.5
A_2B (?) + A(α)	
255U	62.5
A(α)	
328	70
393	80
460	90
546	100
Solid state	
A(α) + A(β)	
142	67–100

B = RbI (228)

B	
638	0
594	10
543	20
487	30
423	40
323	50
B + B_2A	
280U	52
B_2A	
262	60
224	70

B = RbI.—(Continued)

t, °C	M % A
B_2A + A(α)	
195E	75
A(α)	
283	80
430	90
546	100
Solid state	
A(α) + A(β)	
142	34–100

Ag_2S

B = Ag_2Se (185)

t, °C	Wt. % A	
Mix.		
855	0	0
851	2	10
845	5	20
837	10	30
827	15	40
813	21	50
794	32	70
771		74
767	74	
780	92	80
802	97	90
839	100	100
Solid state		
A(α) + A(β)		
177	100	
150	89	
120	75	
111	0	70
90	10	55
74	28	

B = FeS (242)

t, °C	Wt. % B
A(α)	
812	0
620	10
A(α) + B	
615	11
B	
735	20
825	30
910	40
885	50
1045	60
1090	70
1125	80
1155	90
1171	100
Solid state	
A(α) + A(β)	
175	0–90

Ag_2SO_4

B = Li_2SO_4 (166)
v. Fig. 25

B = Na_2SO_4 (166)
v. Fig. 26

B = K_2SO_4 (166)
v. Fig. 27

$AgNO_3$

B = $NaNO_3$ (112)

t, °C	M % B	
Mix_1		
208.6	0	0
212	(17)	10
Mix_1 + Mix_2		
217U	26	20
	40	20
Mix_2		
234	47	30
248	54	40
261	62	50
274	71.5	60
283	78	70
291	86	80
300	94	90
308	100	100
Solid state		
A(α) + A(β)		
159	0	
138	5	
138	20	

B = KCl* (126) (A.)

A	
207.2	0
201.9	1.82
194.0	3.83
164.0	10.26
(?)	
158.8	11.65
190.0	22.08
215.0	23.77
>260	26.36

B = KBr* (126) (A.)

A	
207.2	0
180.6	6.64
163.5	9.64
149.0	11.85
(?)	
141.7	12.86
148.0	14.79
160.6	16.13
190.0	22.08
215.0	23.17

B = KI* (126) (A.)

A	
207.2	0
194.2	3.7
152.2	10.4
(?)	
118.0	14.0
171.0	17.4
>215	26.7

* Reciprocal salt mixtures.

B = KNO_3 (258)

A(α)	
209	0
192	10
172	20
A(β)	
162	24

B = KNO_3.—(Continued)

t, °C	M % B
A(β) + AB	
131E	38
AB	
132	40
AB + B(α)	
134U	45.5
B(α)	
158	50
202	60
242	70
277	80
310	90
339	100
A + B	
120Em	41
Solid state	
B(α) + B(β)	
125	50–100

AgCN

B = NaCN (256)

AB		
471	50	
Mix_1		
455	(51)	60
428	(52)	70
Mix_1 + Mix_2		
424E	(52)	71
	91	71
Mix_2		
490	93.5	80
535	97	90
562	100	100

B = KCN (256)

A + AB	
291E	11
AB	
318	20
340	30
357	40
370	50
320	60
AB + B	
291E	65
B	
385	70
510	80
583	90
622.5	100

Ag_2Te

B = $AuTe_2$ (207)

A(α)	
961	0
775	10
617	20
A(α) + A(β)	
495	30
A(β)	
400	40
A(β) + B	
374E	47.5

Ag_2Te.—(Continued)

B = $AuTe_2$.—(Continued)

t, °C	M % B
B	
377	50
395	60
413	70
430	80
447	90
464	100

MnO

B = B_2O_3 (156) (A.)

t, °C	M % B
(?)	
800	40.34
760	44.35
(?) + AB	
750E	46.30
AB	
770	47.36
840	50.30
820	53.35
AB + AB_2	
800E	55.35
AB_2	
850	59.35
900	62.35
940	65.35
910	68.30
AB_2 + AB_3	
860E	71.30
AB_3	
920	75.27
870	78.24

$MnCl_2$

B = $AlCl_3$ (130) (A.)

M. c. t.

t, °C	M % A
B	
190.2	0
189.9	9.7
186.4	13.5
185.4	16.1
B_2A (?)	
197.2	19.1
203.9	20.9
212.9	23.5
226.9	31.4
A	
271.1	32.4
308.8	34.9

B = $MgCl_2$ (229)

t, °C	M % A
Mix. + liq.	
712	0
702	20
693	30
684	40
677	50
670	60
665	70
655	90
650	100

B = $CaCl_2$ (229)

t, °C	M % A	
Mix_1		
772	0	0
740	(6)	10
705	(15)	20
665	(26)	30
635	(36)	40
607	46	50
590	56	60
Mix_1 + Mix_2		
588	62.5	62.5
Mix_2		
593	75	70
615	87	80
637	96	90
650	100	100
Solid state		
Unmixing		
470	60	
450	50	67

B = $SrCl_2$ (229)

t, °C	M % A
B	
872	0
800	10
720	20
635	30
545	40
B + A	
499E	45
A	
510	50
530	60
555	70
593	80
625	90
650	100

B = $BaCl_2$ (229)

t, °C	M % A
B(α)	
960	0
B(α) + B(β)	
923	6
B(β)	
905	10
842	20
765	30
670	40
560	50
B(β) + A_xB_y	
535U	51.5
A_xB_y	
520	60
A_xB_y + A	
504E	63
A	
557	70
595	80
625	90
650	100

B = LiCl (230)

t, °C	M % B	
Mix_1		
650	0	0
634	3	10
612	8	20
583	17	30

B = LiCl.—(Continued)

t, °C	M % B	
Mix_1 + Mix_2		
562	45	45
Mix_2		
575	79	60
590	92	80
596	96	90
602	100	100

B = NaCl (230)

t, °C	M % A
A	
650	0
628	10
594	20
550	30
490	40
A + A_xB	
442U	46
A_xB + AB_y	
425E	50
AB_y + B	
446U	58
B	
533	65
585	70
680	80
750	90
804	100

B = KCl (230)

t, °C	M % A
A	
650	0
625	10
575	20
505	30
A + AB	
449E	35
AB	
470	40
495	50
465	60
AB + AB_4	
428E	65
AB_4 + B	
445U	69
B	
540	75
620	80
715	90
774	100

$MnBr_2$

B = $AlBr_3$ (130) (A.)

M. c. t.

t, °C	M % A
B	
97.1	0
96.3	0.7
B_2A (?)	
127.1	0.7
171.6	2.0
199.1	4.6
204.6	9.4
210.8	13.8
223.8	20.6
232.9	24.0

B = $AlBr_3$.—(Continued)

t, °C	M % A
B_2A (?)	
241.7	28.0
242.6	29.6
A	
>300	31.0

MnS

B = $MnSiO_3$ (261)

t, °C	M % A
B	
1216	0
1157	5
B + A	
1130E	7
A	
1166 ↓	10
1549	40

$MnSO_4$

B = Na_2SO_4 (55)

t, °C	M % A
Mix. + liq.	
887	0
865	10
830	20
784	30
718	40
665	50
Mix. + BA_3	
645E	54
BA_3	
673	60
708	70
715	75
704	85
685	89*
Solid state	
Mix. + BA_3	
600	43.5
500	25.5
420	14
Mix. + B_3A†	
400	17.5
300	7.5
210	3.5
B(α) + B(β)	
235	0
210	3.5–75

B = Li_2SO_4 (55)

t, °C	M % A
B(α)	
856	0
770	10
660	20
B(α) + A	
580E	28
A	
610	40
628	50
640	60
658	80*
Solid state	
B(α) + B(β)	
565	0–80

* Decompn. of A above 80 M %.

† Forms at 420° over range 14–75 M %.

B = K_2SO_4 (55)

t, °C	M % A	
Mix.		
1066	0	0
1018	(3)	10
948	(8)	20
833	(16)	30
Mix. + A_2B		
680E	23.5	40.5
A_2B		
765	50	
820	60	
842	66.7	
823	75	
A_2B + A		
800E	82	
A		
815	87*	
Solid state		
B(α) + B(β)		
590	0	
560	5–66.7	
Mix. + A_2B		
650	19	
600	13.5	

* A decomposes above 85 M %.

$MnSiO_3$

B = $MnTiO_3$ (245)

t, °C	M % B	
A		
1218	0	
1208	10	
1153	20	
A + Mix.		
1121E	39	22.5
Mix.		
1158	42	30
1199	52	40
1238	66	50
1273	74	60
1306	81	70
1337	88	80
1370	94	90
1404	100	100

There is a transformation at 1050–1060° over range 30–85 M %.

FeF_3

B = NaF (205) (A.)

t, °C	M % A
B	
1040	0
1025	10
1005	15
975	25
945	30
B + (?)	
892E*	35

* All mixtures give a halting pt. at 892°.

$FeBr_2$

B = $AlBr_3$ (130) (A.)

20 M % A soluble in B at 300°.

FeS

B = Na_2S (252) (A.)

t, °C	M % B
A	
835	25.0
685	33.3
A + (?)	
661E	50.0

Exptl. mixtures give a halting pt. at *ca.* 665°.

$CoSO_4$

B = Li_2SO_4 (53)

t, °C	M % A	
Mix.		
856	0	0
785	(5)	10
640	(12)	25
Mix. + A		
595E	14	29
A*		
670	40	
757	50	
850	65	
Solid state		
B(α) + B(β)		
585	0	
577	5	
570	11–25	

* Decomposes above 70 M %.

B = Na_2SO_4 (53)

t, °C	M % A	
Mix.		
887	0	0
850	(5)	10
797	(11)	20
720	(18)	30
622	(27)	40
Mix. + A		
575E	30	50
A		
665	60	
790	70	
900*	78.5	
Solid state†		
Mix. + A		
550	29	
500	26	
450	21	
Mix. + B_3A		
400	15	
350	5	
250	4	

* A decomposes above 900°.

† B_3A forms at 425° and >18 M % A.

B = K_2SO_4 (53)

t, °C	M % A
B(α)	
1066	0
1015	10
935	20
800	30
605	40
B + BA	
535E	42.5
BA + BA_2	
560U	48
BA_2	
605	50
710	60
736	66.7
BA_2 + A	
725E	70.5
A*	
825	77

* Decomposes above 80 M %.

CoAs

B = NiAs (83)

t, °C	Wt. % A
Mix.	
970	0
995	10
1020	20
1045	30
1068	40
1090	50
1110	60
1130	70
1147	80
1163	90
1181	100

$NiBr_2$

B = $AlBr_3$ (130) (A.)

0.54 M % A soluble in B at 300°; 0.78 M % A not completely sol. in B at 360°.

Ni_2S

B = Na_2S (84)

v. Fig. 28

Ni_2S_3

B = Na_2S (84)

v. Fig. 29

$CrCl_3$

B = $AlCl_3$ (130) (A.)

<1.0 M % A soluble in B at 300°.

$CrBr_3$

B = $AlBr_3$ (130) (A.)

<0.5 M % A soluble in B at 300°.

MoO_3

B = Na_2MoO_4 (93)

t, °C	M % A
B	
791	0
700	10
553	20
B + BA	
495E	25
BA	
525	30
574	40
612	50
593	60
BA + B(γ)	
552E	75
B(γ) + B(β)	
575	78
B(β) + B(α)	
620	85.5
B(α)	
686	100
Solid state	
B(γ) + B(δ)	
412	90–100

B = K_2MoO_4 (10)

t, °C	M % B
A	
786	0
682	10
A + A_3B	
526E	20
A_3B	
560	25
A_3B + A_2B	
544E	28.5
A_2B	
558	33.3
529	40
A_2B + AB	
480E	47.5
AB	
484	50
AB + B	
476E	53
B	
620	60
745	70
829	80
888	90
926	100

WO_3

B = Na_2WO_4 (186)

t, °C	M % A
B(α)	
698	0
665	10
B(α) + BA	
626E	19
BA	
668	30
708	40
731	50
729	60
BA + A (?)	
723E	67

B = Na_2WO_4.—(*Continued*)

t, °C	M % A
A (?)	
743	70
A (?) + A (?)	
761U(?)	74
A (?)	
800	81
Solid state	
B(α) + B(β)	
588	0–50
B(β) + B(γ)	
564	0–50

B = K_2WO_4 (11)

t, °C	M % B
A	
875	25
715	35
A + A_2B	
638U	38.5
A_2B	
593	45
A_2B + AB	
548E	48
AB	
555	50
AB + B	
542E	54
B	
625	60
738	70
814	80
862	90
894	100

B_2O_3

B = Li_2O (156) (A.)

t, °C	M % A
AB	
722	47.70
760	50.40
750	53.70
720	55.00
AB + A_2B	
680E	60.36
A_2B	
730	63.20
850	65.00
925	65.90
904	67.70
810	69.70
A_2B + A_3B	
655E	71.20
A_3B	
750	73.34
A_3B + A_4B	
700E	75.90
A_4B	
730	78.72
A_4B + A_5B	
620E	81.28
A_5B	
680	83.70
590	85.10
520	87.06

B = Na_2O (203) (A.)

t, °C		M % B
Mix.		
“vis.”		0–12
t_L	t_M*	
585	579	12.13
582	574	13.81
607	600	15.48
670	664	16.82
719	719	17.82
749	732	18.82
764	754	19.48
783†	779	20.00
746	739	21.12
709		22.12
658	655	23.75
680	667	24.42
694‡	688	25.00
679	672	26.97
615		28.59
580	574	30.15
657	630	31.76
732§	730	33.33

* t_M = temp. of complete fusion.
† A_4B. ‡ A_3B. § A_2B.

Al_2O_3

B = Na_3AlF_6 (74, 193)

t, °C	M % A	
Mix.		
999	0	0
983	7	10
966	13	20
945	18	30
Mix. + (?)		
940E	18.5	32.5
(?)		
975		40
1072		50

AlF_3

B = CaF_2 (73)

t, °C	M % A	
B		
1360		0
(1315)		10
(1245)		20
1120		30
B + Mix.		
820E	52.5	37.5
Mix.		
833	53.5	40
875	(61)	50
890		58

B = LiF (205)

t, °C	M % A
B	
870	0
763	10
B + B_3A	
710E	14.5
B_3A	
760	20
800	25
757	30
B_3A + A (?)	
689E	37

B = NaF (74, 193, 205)

t, °C	M % A	
Mix.		
990	0	0
925	(3)	10
Mix. + B_3A(α)		
885E	(4)	14
B_3A(α)		
960		20
1000		25
980		30
855		37.5
B_3A(α) + B_5A_3		
725U		40
B_5A_3		
700		45
B_5A_3 + A (?)		
685E		47
A?		
770		48.5
Solid state		
B_3A(α) + B_3A(β)		
565		0–37.5

B = KF (205)

t, °C	M % A
B	
885	0
850	5
B + B_3A	
837E	7
B_3A	
885	10
952	15
1000	20
1035	25
995	30
920	35
B_3A + A (?)	
570E(?)	40

There is a transformation in solid state at 301° over 0–25 M % A.

B = RbF (205)

t, °C	M % A
B	
833	0
805	5
B + B_3A(α)	
792E	8
B_3A(α)	
820	10
930	20
975	25
915	30
800	35
B_3A(α) + A (?)	
560E	40
Solid state	
B_3A(α) + B_3A(β)	
352	0–40

B = CsF (205)

t, °C	M % A
B	
715	0
685	5

B = CsF.—(*Continued*)

t, °C	M % A
B + B_3A	
675E	6.5
B_3A	
728	10
810	20
823	25
745	30
B_3A + A (?)	
490E (?)	

$AlCl_3$

B = $AlBr_3$ (118)

t, °C	M % A
B	
97.4	0
88.5	9.0
79.0	21.2
B + A	
73.1E	34.8
A	
84.3	40.6
119.8	57.6
133.8	65.0
149.8	76.1

B = $MgCl_2$ (130) (A.)

M. c. t.

t, °C	M % B
A	
190.2	0
188.6	9.5
187.4	12.4
186.4	15.4
A_2B (?)	
188.0	17.9
207.6	22.1
224.2	27.5
227.4	29.1
B	
>350	30.9

B = $BaCl_2$ (130) (A.)

M. c. t.

t, °C	M % B
A	
190.2	0
A_2B (?)	
191.5	2.0*
191.5	13.0
192.5	14.0
198.8	20.1
209.4	22.8
255.5	27.1

* Two liq. layers from 2.0 to 13.0.

B = LiCl (130) (A.)

M. c. t.

t, °C	M % B
A	
190.2	0
190.0	6.6
187.9	17.2
171.4	29.6
125.6	38.4
114.4	40.1

$AlCl_3$.—(*Continued*)

B = LiCl.—(*Continued*)

t, °C	M % B
AB	
117.8	43.2
132.8	45.8
139.9	47.4
143.0	49.6
143.5m	50.0
B	
170.4	49.6
338.5	50.5

B = NaCl (130) (A.)
M. c. t.

t, °C	M % B
A	
190.2	0
A_xB	
193.5	0.2*
193.5	18.0
192.0	20.1
190.0	22.1
182.0	26.1
169.4	30.6
151.3	33.9
130.2	37.3
AB	
123.6	41.1
140.7	44.8
147.9	47.6
151.9	48.3
B	
153.7	48.4
320.5	49.5

* Two liq. layers from 0.2 to 18.0.

B = KCl (130) (A.)
M. c. t.

t, °C	M % B
A	
190.2	0
A_xB	
193.0	0.4*
193.0	18.5
192.5	19.0
187.4	23.0
177.2	27.0
162.1	31.2
AB	
158.4	34.5
178.7	37.5
213.1	42.9
248.4	48.8
B	
255.5	49.5
375.0	51.5

* Two liq. layers from 0.4 to 18.5.

$AlBr_3$

B = AlI_3 (117) (A.)
Mix. (?)

t, °C	M % B
93.0	0
92.0	0.94
88.6	4.46

B = $MgBr_2$ (130) (A.)
M. c. t.

t, °C	M % B
A	
97.1	0
96.8	0.6
96.5m	1.4
A_2B (?)	
134.9	0.6
160.7	1.4
190.2	3.8
199.6	8.1
210.5	12.9
221.6	18.4
231.5	23.5
B	
>360	24.0

B = $CaBr_2$ (130) (A.)
M. c. t.

t, °C	M % B
A	
97.1	0
A_xB	
208.8	0.8*
208.8	14.0
195.3	15.4
A_2B	
213.1	16.0
229.9	18.9
260.1	24.3
298.4	30.9
306.0	33.3
304.9	33.8
B	
398.0	33.8

* Two liq. layers from 0.8 to 14.0.

B = $BaBr_2$ (130) (A.)
M. c. t.

t, °C	M % B
A	
97.1	0
A_2B	
269.4	0.9*
269.4	16.0
276.7	18.3
292.0	21.2
310.0	24.2
335.0	28.0

* Two liq. layers from 0.9 to 16.0.

B = LiBr (130) (A.)
M. c. t.

t, °C	M % B
A	
97.1	0
A_7B	
107.2	0.6
108.2	2.0
112.4	8.7
114.8	12.5
114.6	14.0
113.0	16.2
A_2B	
117.7	17.1
125.2	25.7
129.4	30.6

B = LiBr.—(*Continued*)

t, °C	M % B
AB	
135.5	34.2
157.9	39.1
180.7	44.9
192.5	48.4
197.0	50.0
195.4	50.6
B	
221.4	51.4
405.0	56.7
510.0	63.9
523.0	74.6
532.0	90.0
535.0	100

B = NaBr (130) (A.)
M. c. t.

t, °C	M % B
A	
97.1	0
94.8	0.9
93.6	1.4
A_xB	
93.0	1.7
94.6	2.2
95.4	2.6*
95.4	16.3
94.2	17.0
91.6	18.4
90.4	19.0
A_7B_2	
92.8	16.9
94.0	18.4
95.4	20.5
96.0	22.2
95.1	23.4
A_2B	
94.8	24.0
98.2	25.1
104.5	31.9
AB	
108.8	32.6
131.2	35.3
154.8	38.9
170.4	42.0
196.4	48.6
201.0	50.0
200.5	50.3
B	
269.0	50.3
360.0	51.1

* Two liq. layers from 2.6 to 16.3.

B = KBr (130) (A.)
M. c. t.

t, °C	M % B
A	
97.1	0
A_xB	
97.5	0.3
98.1	0.4*
98.1	22.1
95.6	23.3
92.2	24.7
A_2B	
88.6	25.8

B = KBr.—(*Cont'd*)

t, °C	M % B
A_2B	
93.0	28.8
95.8	33.3
AB	
109.0	34.7
130.6	37.3
154.6	41.0
171.4	44.5
188.4	49.0
191.5	50.0
189.6	51.3
B	
188.8	52.0
>390	54.7

* Two liq. layers from 0.4 to 22.1.

YF_3

B = CaF_2 (260) (A.)

t, °C	M % A
(?)	
1384	0
1386	6.88
1408	14.26
1389	22.19
1367	30.72
1269	50.00

CeF_3

B = $CaCl_2$* (24) (A.)

t, °C	M % B
(?)	
795	0
1300	5.88
1330	12.34
1360	19.44
1350	36.02
1324	100

* Reciprocal salt mixtures.

B = KF (205)

t, °C	M % B
B	
885	0
860	3.0
838	6.0
809	9.5
708	19.5
692	21.5
B + (?)	
660E*	24.5

* All mixtures give a halting pt. at 640°–660°.

$BeCl_2$

B = $MgCl_2$, $CaCl_2$, $BaCl_2$, LiCl, NaCl (280)

$BeSO_4$

B = K_2SO_4 (94)

t, °C	M % A
B(α)	
1071	0
1005	10
920	20
810	30
B(α) + BA_2	
768E	33

B = K_2SO_4.—(*Cont'd*)

t, °C	M % A
BA_2	
820	40
875	50
910	60
(**925**)	66.7
Solid state	
B(α) + B(β)	
588	0–66

At >800° A decomposes considerably.

MgF_2

B = $Mg_3(PO_4)_2$ (270)

t, °C	M % A
B	
1184	0
1110	8
B + BA	
1076E	**11**
BA(α)	
1170	30
1253	50
1247	60
1220	70
1165	80
BA(α) + A	
1105E	87
A	
1145	90
1194	95
1220	100
Solid state	
BA(α) + BA(β)	
979	0–50
BA(β) + BA(γ)	
845	50–100

B = CaF_2 (28) (A.)

t, °C	M % B
A	
(1264)	0
1157	8.15
1105	21.02
1008	34.74
A + B	
948E*	42.44
B	
954	44.40
1086	59.72
1219	76.16
(1396)	100

* All mixtures give a halting pt. at *ca.* 948°.

B = LiF (248)

t, °C	M % A	
Mix_1		
840	0	0
807	5	10
758	13	20
698	27	30
672	39	40
Mix_1 + Mix_2		
669	45	45
Mix_2 + liq.		
673	50	
690	62	
(1053)	(76.5)	

$MgCl_2$

B = $MgSO_4$ (124)

t, °C	M % B
A	
703	0
690	10
A + B	
667E	20
B	
815	30
910	40
980	50
1035	60
1185	100

B = $CaCl_2$ (159)

t, °C	M % B
A	
711	0
695	10
670	20
645	30
A + B	
621E	39
B	
660	50
690	60
720	70
745	80
765	90
777	100

B = $SrCl_2$ (229)

t, °C	M % B
A	
712	0
685	10
605	30
565	40
A + B	
532E	50
B	
675	60
770	75
825	85
872	100

B = $BaCl_2$ (229)

t, °C	M % B
A	
712	0
695	10
660	20
600	30
A + A_xB_y	
560E	34.5
A_xB_y + B(β)	
590U	38
B(β)	
745	55
845	70
885	80
910	90
B(β) + B(α)	
923	94
B(α)	
960	100

B = LiCl (229)

t, °C	M % A
Mix. + liq.	
602	0
588	10
578	20
570	40
580	60
593	70
660	90
712	100

B = NaCl (159, 243)

t, °C	M % B
A	
711	0
660	15
570	35
510	45
A + AB	
450U	51
AB + AB_x	
430E	56
AB_x + B	
468U	61
B	
560	70
672	80
755	90
803	100

B = KCl (159)

t, °C	M % B
A	
711	0
678	10
639	20
586	30
506	40
A + AB	
475E	42.5
AB	
489	50
460	60
AB + AB_2	
433E	65
AB_2	
436	66.7
AB_2 + B	
426E	67.5
B	
497	70
623	80
710	90
776	100

$MgBr_2$

B = LiBr (129)

t, °C	M % A	
Mix_1		
552	0	0
552		10
548	10	
542		20
514	20	
537		30
512	30	
542		40
534	40	

B = LiBr.—(*Cont'd*)

t, °C	M % A	
Mix_1 + Mix_2		
548U	43	43
	82	43
Mix_2		
578	(83)	50
616	(84)	60
645	(86)	70
670	(89)	80
692	(94)	90
711	100	100

B = NaBr (129)

t, °C	M % A
B	
742	0
707	10
655	20
570	30
B + A	
431E	41
A	
500	50
565	60
625	70
663	80
690	90
711	100

B = KBr (129)

t, °C	M % A
B	
730	0
702	10
627	20
450	30
B + B_2A	
348UE	33.3
B_2A + BA	
334E	35
BA	
368	40
BA + A	
391U	48
A	
410	50
500	60
575	70
638	80
682	90
711	100

$MgSO_4$

B = Na_2SO_4 (91, 165)

v. Fig. 30

B = K_2SO_4 (90, 165)

t, °C	M % B
A	
1124	0
965	15
A + A_2B	
884E	22
A_2B	
910	25
930	33.3
910	40
835	50

B = K_2SO_4.—(*Continued*)

t, °C	M % B	
A_2B + Mix.		
746E	92	62
Mix.		
850	(94)	70
960	(96)	80
1030	(99)	90
1076	100	100
Solid state		
B(α) + B(β)		
580	33.3–97	
595	100	

CaO

B = $CaCl_2$ (19, 20, 222) (A.)

t, °C	M % A
B	
765	0
742	5.72
727	10.23
B + A	
774E	(?)
A*	
800	12.96
860 ↓	(24)
940 ↓	(24)

k_B = 40.0 (1.0).

*Slight mix. formation.

CaF_2

B = $CaCl_2$ (168, 201)

t, °C	M % A
B	
774	0
705	10
B + BA	
644E	19
BA	
695	30
725	40
BA + A	
737U	42
A	
820	50
940	60
1045	70
1140	80

B = CaI_2 (219) (A.)

t, °C	M % B
(?)	
1330	0
625*	82.5
740	100

* Minimum t_L.

B = $Ca_3(PO_4)_2$ (168)

t, °C	M % A
B_3A	
(1650)	25
1510	55
1410	70
1255	85
B_3A + A	
1205E	88

B = $Ca_3(PO_4)_2$.—(*Continued*)

t, °C	M % A
A	
1255	90
1335	95
1392	100

B = $CaSiO_3$ (127)

t, °C	M % A
B	
1512	0
1380	10
1290	20
1215	30
1170	40
B + A	
1126E	47
A	
1140	50
1205	60
1270	70
1330	80
1365	90
1378	100

B = NaF (75)

t, °C	M % B
A	
1360	0
1080	20
950	35
A + B	
810E	53
B	
880	70
940	85
990	100

$CaCl_2$

B = $CaBr_2$ (219) (A.)

t, °C	M % B
Mix.	
780	0
735*	60
760	100

* Minimum t_L.

B = $CaSO_4$ (221) (A.)

t, °C	M % B
A	
765	0
748	4.96
738	6.52
733	8.62
727	10.53

k_A = 39.0 (1.1).

B = $Ca_3(PO_4)_2$ (168)

t, °C	M % A
B_3A	
(1530)	25
(1500)	50
(1380)	75
1280	85
1190	90
B_3A + BA	
1040U	95
BA + A	
770E	99

B = $Ca_3(PO_4)_2$.—(*Continued*)

t, °C	M % A
A	
772	100

B = $CaCO_3$ (221) (A.)

t, °C	M % B
A	
765	0
751	3.84
741	5.82
732	7.78

k_A = 41.0 (0.76).

B = $CaSiO_3$ (128)

t, °C	M % A
B	
1501	0
1460	10
1390	20
1300	30
1220	40
1170	50
1120	60
1060	70
990	80
900	90
B + A	
765E	99
A	
772	100

CaO forms during melting.

B = SrO* (222) (A.)

t, °C	M % B
A (?) Mix.	
765	0
752	1.37
733	3.44
707	6.05

* Reciprocal salt mixtures.

B = $SrCl_2$ (229, 238, 262)

t, °C	M % A	
Mix_1		
772	0	0
732	(7)	10
690	(14)	20
652	(27)	30
Mix_1 + Mix_2		
646	35	35
Mix_2		
655	(41)	40
690	(54)	50
730	(65)	60
770	(76)	70
808	(85)	80
842	(93)	90
872	100	100
Solid state		
Unmixing		
560	35	
550	25	44
535	20	50

B = BaO* (222) (A.)

t, °C	M % B
A (?) Mix.	
765	0
742	2.38
716	4.65

* Reciprocal salt mixtures.

B = $BaCl_2$ (219, 229, 238)

t, °C	M % B
A	
772	0
715	10
668	20
620	30
A + B(α)	
600E	35
B(β)	
635	40
700	50
810	70
907	90
B(β) + B(α)	
923	93
B(α)	
960	100

k_A = 38.0 (2.5) (144) (A.)

B = $BaSO_4$* (221) (A.)

t, °C	M % B
A (?) Mix.	
765	0
756	1.31
743	3.43
716	6.63

* Reciprocal salt mixtures.

B = LiCl (95, 229)

t, °C	M % A	
Mix_1		
612	0	0
581	(4)	10
555	(8)	20
524	(11)	30
Mix_1 + Mix_2		
496E	(15)	37.5
	(85)	37.5
Mix_2		
507	(86)	40
547	(87)	50
587	(89)	60
640	(92)	70
700	(95)	80
740	(97)	90
774	100	100
Solid state		
Unmixing		
441	0–100	

B = NaCl (159, 243)

t, °C	M % A
B	
798	0
765	10
720	20
670	30
600	40

$CaCl_2$.—(Cont'd)

B = NaCl.—(Continued)

t, °C	M % A
B + A	
505E	51.5
A	
555	60
615	70
675	80
725	90
770	100

k_B = 18.0 (5.0) (144) (A.).

B = KCl (159)

t, °C	M % B
A	
777	0
740	10
685	20
A + AB	
640E	26
AB	
680	30
735	40
754	50
715	60
650	70
AB + B	
600E	75
B	
650	80
728	90
776	100

$CaBr_2$

B = LiBr (129)

t, °C	M % A	
Mix₁		
552	0	0
552		10
542	10	
551		20
532	20	
545		30
533	30	
552		40
544	40	
Mix₁ + Mix₂		
562E	42.5	42.5
	82	42.5
Mix₂		
578	83	50
590	83	60
628	85	70
688	92	80
722	98	90
730	100	100

B = NaBr (129)

t, °C	M % A	
Mix₁		
742	0	0
715	7	10
678	14	20
630	20	30
580	26	40
535	30	50

B = NaBr.—(Continued)

t, °C	M % A	
Mix₁ + Mix₂		
514E	32	60
	87	60
Mix₂		
598	90	70
650	93	80
695	96	90
730	100	100

A_2B forms below 468°.

B = KBr (129)

t, °C	M % A
B	
730	0
695	10
643	20
585	30
B + BA	
545E	35.5
BA	
610	40
637	50
615	60
BA + A	
562E	67
A	
580	70
635	80
687	90
730	100

CaS

B = $CaSiO_3$ (146)

t, °C	M % A	
Mix.		
1512	0	0
1480	3	10
1460	7	20
1445	9	30
1425	14	40
1395	30	50
1370	50	
Solid state Unmixing		
1301	20	
1250	7	29
1200	4	33
1150		35

$CaSO_4$

B = Li_2SO_4 (164)

t, °C	M % A
B(α)	
843	0
755	10
B(α) + A	
700E	18
A	
760	25
820	30
912	40
990	50
1055	60
1122	70

A decomposes above 1200°.

B = Na_2SO_4 (48, 164)

t, °C	M % A	
Mix₁		
881	0	0
913	(12)	5
955	(16)	10
B_4A		
944		20
Mix₂		
940	(21)	30
Mix₂ + A		
913E	(33)	40
A		
940		50
995		60
1070		70
1155		80
Solid state B(α) + B(β)		
231		0
200		2½
178		4
200		6½
240		15

B = K_2SO_4 (94, 164)

t, °C	M % A	
Mix.		
1057	0	0
1040	(1)	10
1008	(3)	20
955	(6)	30
Mix. + $BA_2(\beta)$		
867E	(10)	42
$BA_2(\beta)$		
920		50
$BA_2(\beta) + BA_2(\alpha)$		
936		56
$BA_2(\alpha)$		
985		60
$BA_2(\alpha)$ + A		
1004UE		66.7
A		
1050		70
1150		80
Solid state B(α) + B(β)		
580		0
553		5–66

B = Rb_2SO_4 (164) v. Fig. 31 >1200° A decomposes.

$Ca(NO_3)_2$

B = $NaNO_3$ (160) (A.)

t, °C	M % A
B	
315.1	0
303.9	5.27
285.6	11.11
272.9	17.65
249.8	25.00
B + A	
236.5E	33.33

B = $NaNO_3$.—(Continued)

t, °C	M % A
A	
284.1	42.86
355.4	53.85
421.0	66.66
490.0	81.82

B = KNO_3 (160) (A.)

t, °C	M % A
B	
346.0	0
318.5	5.27
295.2	11.11
262.2	17.65
B + A	
210.5E	25.00
A	
221.9	33.33
263.3	42.86
345.3	53.85
450.0	66.66
508.4	81.82

$Ca_3(PO_4)_2$

B = $Na_2B_4O_7$* (204) (A.)

t, °C	M % A
(?)	
732	0
655	3.30
475	6.74
575	10.30
640	14.00

* Reciprocal salt mixtures.

$CaCO_3$*

B = Na_2CO_3† (172)

t, °C	M % A	
Mix.		
860	0	0
872	(6)	5
875	(7)	7
870	(10)	15
851	(20)	25
812	(27)	35
Mix. + AB		
786E	28	38
AB		
800		40
812		50

B = K_2CO_3† (172)

t, °C	M % A	
Mix.		
896	0	0
888	(4)	10
849	(10)	20
803	(13)	30
Mix. + AB		
753E	17	39
AB		
777		40
800		45
814		50

* A decomposes above 50 M %

† Under 1 atm. CO_2.

$CaSiO_3$

B = $CaTiO_3$ (245)

t, °C	M % B	
Mix.		
1512		0
1460		10
1435		20
1425		30
1430		40
1440		50
1465		60
1490		75
Solid state Unmixing		
1350	49	
1300	34	61
1250	28	64
1200	23	

SrO

B = $SrCl_2$ (20, 222) (A.)

t, °C	M % A
B	
873	0
846	3.81
834	5.26
807	8.05
797	11.38
A (?)	
910	25.40

k_B = 107 (0.81).

B = $BaCl_2$*(222) (A.)

t, °C	M % A
B (?) Mix.	
960	0
925	3.42
907	6.32
897	7.87

* Reciprocal salt mixtures.

SrF_2

B = $SrCl_2$ (201, 270)

t, °C	M % A
B	
874	0
815	5
B + BA	
753E	13
BA	
890	25
962	50
BA + A	
952E	63
A	
1045	70
1165	80
1400	100

B = $Sr_3(PO_4)_2$ (270)

t, °C	M % B
A	
1400	0
1325	5
A + AB_3	
1207E	10

B = $Sr_3(PO_4)_2$.—(Continued)

t, °C	M % B
AB_3	
1350	20
1685	75

B = BaF_2 (28) (A.)

t, °C	M % B
Mix.	
1146	15.12
1188	23.42
1174	41.64
1200	62.47

$SrCl_2$

B = $SrSO_4$ (221) (A.)

t, °C	M % B
A	
873	0
842	4.61
828	7.08
813	9.35

k_A = 95 (0.65).

B = $Sr_3(PO_4)_2$ (270)

t, °C	M % B
A	
874	0
A + AB_3	
828E	2
AB_3	
930	5
1070	10
1235	20
1625	75

B = $SrCO_3$ (221) (A.)

t, °C	M % B
A	
873	0
854	2.70
841	4.25
829	6.25
817	8.29

k_A = 107 (0.57).

B = BaO* (222)

t, °C	M % A
B (?) Mix.	
960	0
934	2.17
905	3.60
890	6.66

* Reciprocal salt mixtures.

B = $BaCl_2$ (219, 229, 262)

t, °C	M % B
Mix. + liq.	
870	0
860	10
850	20
847	30
850	40
860	50
870	60
885	70
905	80
930	90
955	100

B = $BaCl_2$.—(*Continued*)

t, °C	M % B
Solid state	
B(α) + B(β)	
635	10
640	20
660	30
685	40
715	50
755	60
790	70
835	80
875	90
922	100

B = LiCl (229)

t, °C	M % A
B	
602	0
590	10
568	20
536	30
B + A	
473E	47
A	
500	50
584	60
660	70
737	80
808	90
872	100

B = NaCl (144, 262)

B	
798	0
762	10
720	20
673	30
620	40
B + A	
565E	50
A	
624 ↓	60
870 ↓	100

k_B = 17.6 (5.0) (A.).

B = KCl (262)

B	
775	0
727	10
666	20
B + B_2A	
596E	28
B_2A	
597	33.3
587	40
B_2A + BA_2	
575E	43
BA_2	
605	50
632	60
BA_2 + A	
638UE	66.7

B = KCl.—(*Continued*)

t, °C	M % A
A	
665	70
743	80
810	90
870	100

$SrBr_2$

B = LiBr (129)

B	
552	0
498	20
B + A_2B	
453E	33
A_2B	
472	40
492	50
A_2B + A	
503U	61.5
A	
558	75
595	85
643	100

B = NaBr (129)

B	
742	0
695	15
635	30
567	45
B + A	
486E	61
A	
547	75
608	90
643	100

B = KBr (129)

B	
730	0
698	10
600	25
B + B_2A	
556E	29
B_2A	
559	33.3
554	40
B_2A + BA_2	
534E	50
BA_2	
566	60
574	66.7
570	75
BA_2 + A	
562E	82
A	
601	90
643	100

$SrSO_4$

B = Li_2SO_4 (51)

B(α)	
856	0
792	10
B(α) + A	
746E	16.5

B = Li_2SO_4.—(*Continued*)

t, °C	M % A
A	
830	20
940	30
1010	40
1070	50
1140*	65
(1225)	100
Solid state	
B(α) + B(β)	
585	0–65

* Decompn. of A above 80 M %.

B = Na_2SO_4 (48, 49)

Mix. + liq.	
887	0
945	10
973	25*
970	30
Mix. + A	
955E	39
A	
1055	50
1115	60
1155	70†
Solid state	
Mix. + A	
900	36
800	30
700	24
500	13
300	5
B(α) + B(β)	
234	0
224	3–70

* Possible formation of B_3A.
† Decompn. of A above 70 M %.

B = K_2SO_4 (48, 49, 94)

Mix.		
1071	0	0
1080		5
1063	(9)	15
1005	(18)	30
Mix. + A_2B(α)		
970E	22	37
A_2B(α) + A(β)		
980U	41.5	
A(β)		
1075	50	
A(β) + A(α)		
1152	60	
A(α)		
1605	100	
Solid state		
B(α) + B(β)		
588	0	
560	5–66.7	
A_2B(α) + A_2B(β)		
775	20–60	
Mix. + A_2B(α)		
900	21.5	
800	20.5	

B = K_2SO_4.—(*Continued*)

t, °C	M % A
Mix. + A_2B(β)	
700	15
600	8

$SrCO_3$

B = NaCl* (221) (A.)

B	
802	0
794	1.27
787	2.51
776	3.77
772	5.05

* Reciprocal salt mixtures.

BaO

B = $BaCl_2$ (19, 222) (A.)

B	
960	0
938	2.03
920	5.14
905	8.57
892	13.04
870*	32.08

* Minimum t_L.

BaF_2

B = $BaCl_2$ (201, 270)

B	
958	0
895	10
B + BA	
844E	19.5
BA	
948	30
995	40
1008	50
995	60
955	70
BA + A	
936E	73
A	
1018	80
1289	100

B = BaI_2 (219) (A.)

t, °C	M % B
(?)	
1280	0
670*	92.5

* Minimum t_L.

B = $Ba_3(PO_4)_2$ (270)

A	
1289	0
1150	10
A + AB_3	
1092E	13
AB_3	
1195	20
1300	30
1380	40
1670	75

B = KF (203)

t, °C	M % A
B	
885	0
867	10
847	20
825	30
800	40
770	50
B + A	
750E	55
A	
790	60
885	70
1000	80
1130	90
1280	100

$BaCl_2$

B = $BaBr_2$ (219) (A.)

t, °C	M % B
Mix. (?)	
960	0
870*	90
880	100

* Minimum t_L.

B = BaI_2 (219) (A.)

Mix. (?)	
960	0
700*	90
740	100

* Minimum t_L.

B = $BaSO_4$ (221) (A.)

A	
960	0
943	2.04
926	4.38
908	7.81
897	10.74

B = $Ba_3(PO_4)_2$ (270)

A	
958	0
A + B	
898E	4.5
B	
1015	7.5
1065	10
1215	20
1584	100

B = $BaCO_3$ (221) (A.)

A	
960	0
907	6.97
900	9.43
888	13.41

B = $BaSiO_3$ (261)

t, °C	M % A
B	
1464	0
1370	10
1265	20
1180	30

B = $BaSiO_3$.—(*Continued*)

t, °C	M % A
B	
1120	40
1070	50
1035	60
1000	70
965	80
920	90
B + A	
902E	92.5
A	
942	95
968	100

B = $BaCrO_4$ (219) (A.)

t, °C	M % B
A	
960	0
940	3.03
920	5.70
902	8.92
894	11.36

B = LiCl (229)

t, °C	M % A
B	
602	0
584	10
560	20
530	30
B + A(β)	
510E	35
A(β)	
560	40
650	50
715	60
775	70
830	80
880	90
A(β) + A(α)	
923	97
A(α)	
960	100

B = NaCl (87)

B	
798	0
764	10
755	20
693	30
B + A(β)	
654E	40
A(β)	
715	50
770	60
817	70
861	80
900	90
A(β) + A(α)	
930	96.5
A(α)	
955	100

k_B = 22.0 (1.2) (221) (A.).

$BaCl_2$.—(*Continued*)

B = KCl (87, 154, 262)

t, °C	M % A
B	
775	0
735	10
685	20
B + B_2A	
660E	24.5
B_2A	
662	30
663	33.3
660	40
B_2A + A(β)	
652E	45
A(β)	
690	50
760	60
820	70
870	80
910	90
A(β) + A(α)	
930	96
A(α)	
955	100

$Ba(ClO_3)_2$

B = $NaClO_3$ (78) (A.)

t, °C	M % A
B	
255.0	0
254.2	0.81
252.9	2.02
251.2	3.56

k_B = 10.9 (0.35).

$BaBr_2$

B = LiBr (129)

t, °C	M % A
B	
552	0
525	10
497	20
B + A	
484E	25
A	
509	30
563	40
670	60
760	80
847	100

B = NaBr (129)

t, °C	M % A
B	
742	0
709	10
674	20
635	30
B + A	
599E	40
A	
648	50
693	60
777	80
813	90
847	100

B = KBr (129)

t, °C	M % A
B	
730	0
693	10
647	20
B + B_2A	
633E	22.5
B_2A	
634	30
635	33.3
630	40
616	50
B_2A + A	
612E	53
A	
655	60
712	70
770	80
814	90
847	100

BaS

B = $BaSiO_3$ (261)

t, °C	M % A
B	
1464	0
1420	10
1360	20
B + A (?)	
1325E	25
A (?)	
1375	30
1475	40

$BaSO_4$

B = Li_2SO_4 (51)

t, °C	M % A
B(α)	
856	0
801	5
B(α) + A	
760E	9
A	
835	15
1010	30
1095	40
1125	45
(1350)	100
Solid state	
B(α) + B(β)	
585	0–45

>1000° A decomposes considerably.

B = NaCl* (219) (A.)

t, °C	M % A
B	
802	0
784	2.78
775	4.31
765	5.84

* Reciprocal salt mixtures.

B = Na_2SO_4 (48)

t, °C	M % A
Mix. + liq.	
887	0
917	10
921	15

B = Na_2SO_4.—(*Continued*)

t, °C	M % A
Mix. + A	
913E	20
A	
990	30
1050	40
1110	50
1160*	58
1345	100
Solid state	
B(α) + B(β)	
240	0
230	2–60
Mix. + A	
800	15.5
700	10.5
600	7

* Decompn. of A above 1100°.

B = KCl* (221) (A.)

t, °C	M % A
B	
771	0
752	3.04
736	5.96
727	7.27

* Reciprocal salt mixtures.

B = K_2SO_4 (48, 49, 94)

t, °C	M % A	
Mix.		
1071	0	0
1081	10	10
1060	(16)	20
Mix. + A(β)		
1016E	24	30
A(β)		
1090	40	
A(β) + A(α)		
1149	48	
A(α)		
1265	60	
1580	100	
Solid state		
B(α) + B(β)		
588	0	
572	2–100	
Mix. + A		
950	19.5	
800	10	
700	5.5	

$Ba(NO_3)_2$

B = $LiNO_3$ (107) (A.)

t, °C	M % B
B	
436.6	75.00
403.6	82.35
364.4	88.88
303.2	94.73
254.1	100

B = $NaNO_3$ (107) (A.)

t, °C	M % A
B	
314.1	0
296.6	5.27
B + A	
358.3E	11.11
A	
396.5	17.65
435.3	25.00
463.0	33.33
484.2	42.86
492.6	53.85
501.7	66.66
529.6	81.82
595.5	100

B = KNO_3 (107) (A.)

t, °C	M % A
B	
346.3	0
333.8	5.27
B + A	
311.9E	11.11
A	
350.0	17.65
380.0	25.00
434 0	33.33
474.3	42.86
493.9	53.85
495.3	66.66
514.4	81.82
595.5	100

$BaCO_3$

B = Na_2CO_3 (221) (A.)

t, °C	M % A
B	
860	0
843	5.89
837	7.37
828	10.29
823	12.21

k_B = 29.5 (1.3).

LiOH

B = LiF (237)

Mix₁		
840	0	0
807	(1)	10
770	(2)	20
730	(2)	30
683	(3)	40
630	(3)	50
565	(3)	60
490	(3)	70
Mix_1 + Mix_2		
430E	3	80
	90	80
Mix_2		
447	96	90
462	100	100

B = LiCl (237)

t, °C	M % A
B	
605	0
540	10
500	20
477	30
383	40
B + A_2B_3	
315U	50
A_2B_3	
298	60
A_2B_3 + A	
290E	63
A	
325 ↓	70
462	100

B = LiBr (237)

t, °C	M % A
B	
550	0
490	10
443	20
384	30
315	40
B + BA_3	
275E	45
BA_3	
302	60
BA_3 + A	
310U	65
A	
332	70
380	80
423	90
462	100

B = LiI (237)

t, °C	M % A
B	
440	0
370	10
305	20
250	30
203	40
B + BA_4	
180E	45.5
BA_4	
235	50
295	60
320	70
BA_4 + A	
330U	78
A	
405	90
462	100

LiCl

B = NaCl (215, 238, 278)

t, °C	M % B	
Mix_1		
614	0	0
587	7	10
566	15	20

B = NaCl.—(*Continued*)

t, °C	M % B	
Mix_1 + Mix_2		
552	28	28
Mix_2		
570	42	35
582	50	40
615	62	50
655	72	60
698	83	70
738	89	80
780	95	90
819	100	100
Solid state		
Unmixing		
291	22.5	
301	25	
306	30	
314	35	
312	40	
302	50	
299	55	

B = KCl (238, 278)

t, °C	M % B
A	
614	0
569	10
510	20
443	30
A + B	
352E	41
B	
450	50
532	60
605	70
673	80
735	90
790	100

B = RbCl (215, 278)

t, °C	M % B
A	
614	0
568	10
511	20
438	30
352	40
A + B	
312E	44.5
B	
367	50
460	60
550	70
623	80
680	90
726	100

B = CsCl (138)

t, °C	M % A
B(α)	
635	0
605	10
520	25
B(α) + B(β)	
479	30
B(β)	
438	35

B = CsCl.—(*Continued*)

t, °C	M % A
$B(\beta) + B_2A(\alpha)$	
380U	41
$B_2A(\alpha) + B_2A(\beta)$	
360	46
$B_2A(\beta)$ + BA	
350UE	50
BA + B	
332E	57
B	
347	60
415	70
500	80
560	90
609	100

LiBr

B = NaBr (129)

t, °C	M % B	
Mix_1		
552	0	0
535	6	10
$Mix_1 + Mix_2$		
525	20	20
Mix_2		
537	41	30
595	65	50
660	82	70
715	95	90
742	100	100

B = KBr (129)

A	
552	0
514	10
465	20
410	30
A + B	
348E	40
B	
445	50
535	60
608	70
663	80
702	90
730	100

Li_2SO_4

B = $LiNO_3$ (7)

t, °C	M % A
B	
255	0
B + A	
252E	2
A	
350	5
435	10
555*	22
860	100

* Decompn. above 600°.

B = Li_2CO_3 (2)

Mix_1		
732	0	0
645	(4)	30
610	(5)	40

B = Li_2CO_3.—(*Continued*)

t, °C	M % A	
$Mix_1 + Mix_2$		
530E	6	60.5
	90	60.5
Mix_2		
617 ↓	(92.5)	70
860	100	100
Solid state		
$A(\alpha) + A(\beta)$		
550	92.5	
578	100	

B = Na_2SO_4 (166) *v.* Fig. 32

B = K_2SO_4 (166) *v. also* Fig. 33

t, °C	M % B
$B(\alpha)$	
899	80
990	90
1076	100

At 420 and 435° there is a transformation of AB.

$LiNO_3$

B = Li_2CO_3 (7)

A	
255	0
A + B	
250E	2
B	
395	5
500	10
590	20
620*	30
732	100

* Decompn. above 600°.

B = $NaNO_3$ (62) (A.)

Mix. (?)	
253	0
244	8.28
234	16.87
223	25.81
214	35.12
206	44.80
217	54.91
236	65.46
259	76.46
283	87.96
308	100

B = KNO_3 (60, 107) (A.)

t, °C	M % A
B	
337	0
290	14.00
255	20.46
223	26.80
186	32.80
139	38.56

B = KNO_3.—(*Continued*)

t, °C	M % A
A	
143	49.40
174	59.42
200	68.72
224	81.46
242	92.14
253	100

Li_2CO_3

B = K_2CO_3 (64) (A.)

B	
860	0
777	9.0
720	16.5
682	20.0
590	31.0
515	39.5
BA	
492m	33.0
500m	39.5
505	44.2
515	50.0
505	54.5
492	62.0
A	
525	66.6
600	77.0
638	83.5
673	91.0
710	100

$LiBO_2$

B = $NaBO_2$ (134)

Mix_1		
966	0	0
910	(1)	15
865	(1)	25
810	(2)	35
735	(2)	45
$Mix_1 + Mix_2$		
639E	3	55
	95	55
Mix_2		
725	(97)	75
800	(99)	90
843	100	100

NaOH

B = NaF (236)

Mix_1		
1005	0	0
950	4	20
845	10	40
670	15	60
450	18	80
$Mix_1 + Mix_2$		
365U	18	90
	52	90
Mix_2		
335	67	95
310	100	100

B = NaF.—(*Continued*)

t, °C	M % A
Solid state	
$A(\alpha) + A(\beta)$	
282	20–70
285	80
290	100

B = NaCl (236)

Mix_1		
806	0	0
785	(1)	10
750	(3)	20
705	(6)	30
650	(8)	40
575	(10)	50
495	(11)	60
410	(12)	70
$Mix_1 + Mix_2$		
360U	12	78
	49	78
Mix_2		
350	53	85
325	74	95
310	100	100
Solid state		
$A(\alpha) + A(\beta)$		
290	100	
260	90	
175	75	
160	10–100	

B = NaBr (236)

B	
765	0
728	10
683	20
568	40
497	50
420	60
340	70
$B + A(\beta)$	
260E	79.5
$A(\beta) + A(\alpha)$	
290	91
$A(\alpha)$	
310	100

B = NaI (236)

B	
665	0
620	15
555	30
497	40
425	50
$B + B_3A_2$	
295U	64
B_3A_2	
285	70
265	75
$B_3A_2 + A(\beta)$	
225E	80.5
$A(\beta)$	
275	90
$A(\beta) + A(\alpha)$	
290	94
$A(\alpha)$	
310	100

B = NaI.—(*Continued*)

t, °C	M % A
Solid state	
$A(\beta)$	
290	100

B = Na_2CO_3 (171) (A.)

t, °C	M % B
Mix. (?)	
296	0
290	1.03
284.7	2.55
280	5.07
283	7.27
297	10.91

B = KOH (111, 171)

t, °C	Wt. % B
Mix.* + liq.	
290	0
278	10
262	20
215	40
184	50
168	55
167	60
185	70
220	80
345	100

* Mix. A = 97.3 NaOH, 2.55Na_2CO_3, 0.15H_2O. Mix. B = 83.4KOH, 2.9K_2CO_3, 13.7H_2O.

B = RbOH (111) *v.* Fig. 34

NaF

B = NaCl (201, 273)

t, °C	M % A
B	
797	0
760	10
724	20
B + A	
675E	34.5
A	
706	40
765	50
820	60
867	70
909	80
950	90
986	100

B = $NaClO_3$ (78) (A.)

B	
255.0	0
254.1	0.91
253.9	1.03
253.5	1.61

k_B = 10.7 (0.15).

B = NaI (219) (A.)

t, °C	M % B
(?)	
980	0
620*	80
675	100

* Minimum t_L.

B = Na_2SO_4 (273)

t, °C	M % A
$B(\alpha)$	
881	0
827	10
780	20
$B(\alpha) + BA(\alpha)$	
743E	30
$BA(\alpha)$	
772	40
781	50
$BA(\alpha)$ + A	
772E	60
A	
832 ↓	70
986	100
Solid state	
$B(\alpha) + B(\beta)$	
233	0–50
$BA(\alpha) + BA(\beta)$	
105	40–60

B = Na_2CO_3 (8)

B	
854 ↓	0
730	30
B + A	
690E	40
A	
743 ↓	50
1000	100

B = Na_3AlF_6 (74, 153)

B		
999	0	
992	25	
969	55	
933	70	
911	75	
B + Mix.		
886E	80	78
Mix.		
899	82	80
951	91	90
984	100	100

B = KF (142)

B		
997	0	
953	10	
907	20	
858	30	
807	40	
757	50	
B + Mix.		
699E	82	60

NaF.—(*Continued*)

B = KF.—(*Continued*)

t, °C	M % A	
Mix.		
737	(86)	70
773	(90)	80
807	(95)	90
837	100	100

$NaHF_2$

B = KHF_2 (161) (A.)

B	
227.0	0
217.5	6.22
213.0	12.28
175E(?)	23.94

NaCl

B = $NaClO_3$ (78) (A.)

B	
255.0	0
254.5	0.53
254.2	0.87
253.4	1.56

k_B = 10.5 (0.15).

B = NaBr (1, 241)

Mix. + liq.	
748	0
746	10
744.5	20
744	30
744.5	40
747	50
754	60
765	70
777	80
791	90
808	100

B = NaI (1, 241)

Mix.		
662	0	0
638	3	10
615	8	20
592	15	30
Mix. + A		
578E	24	36
A		
594 ↓		40
706		70
739		80
770		90
808		100

B = Na_2SO_4 (125, 273)

B(α)	
881	0
783	20
737	30
690	40
B + A	
623E	55

B = Na_2SO_4.—(*Continued*)

t, °C	M % A
A	
650	60
728	80
797	100
Solid state	
233	0
224	3–100

k_A = 20.4 (5); = 23 (1.0). k_B = 44 (1.0) (221) (A.).

B = $NaNO_2$ (157) (A.)

Mix.	
281.5	0
279.0	0.12
283.5	0.30
288.5	0.59
291.0	0.82
295.0	1.17
309.0	3.46
319.0	5.85
334.5	9.54

B = $NaNO_3$ (196) (A.)

B	
312.0	0
308.0	3.44
B + A	
304.0 E	6.82
A	
332.0	8.35
380.5	12.58

B = $Na_4P_2O_7$ (63)

t, °C	M % B
A	
778	0
762	10
743	20
710	30
690	40

B = Na_2CO_3 (8)

t, °C	M % A
B	
854 ↓	0
670	50
B + A	
636E	58.5
A	
665 ↓	65
808	100

k_A = 18.0 (1.1). k_B = 30.0 (1.5) (221) (A.).

B = NaCN (256)

t, °C	M % B	
Mix.		
795	0	0
776	6	10
756	13	20
735	20	30
713	27	40
689	37	50
665	46	60

B = NaCN.—(*Continued*)

t, °C	M % B	
Mix.		
640	56	70
614	68	80
587	82	90
562.3	100	100

B = Na_2CrO_4 (221) (A.)

A	
802	0
788	3.55
782	4.84
779	5.73

k_A = 22 (1.0).

B = KCl (87, 142, 169, 250, 255)

Mix. + liq.		
798	0	
760	15	
697	30	
660	50	
665	60	
700	80	
775	100	
Solid state		
Unmixing		
373	40	
360	21	66
340	11	81

B = K_2SO_4* (221) (A.)

A (?) Mix.	
802	0
785	2.06
768	3.99
756	5.32

B = K_2CO_3* (220, 221) (A.)

t, °C	M % A
B (?) Mix.	
909	0
892	3.39
858	11.02
825	15.95
810	19.09
A (?) Mix.	
763	94.68
774	96.72
789	98.39
802	100

B = RbCl (215, 278)

B	
726	0
642	20
602	30
B + A	
541E	45.5
A	
565	50
623	60
701 ↓	75
819	100

* Reciprocal salt mixtures.

B = CsCl (278)

t, °C	M % A
B(α)	
646	0
600	10
553	20
505	30
B(α) + A	
493E	34
A	
523	40
580	50
635	60
685	70
730	80
775	90
819	100
Solid state	
B(α) + B(β)	
451	0–100

$NaClO_3$

B = NaBr (78) (A.)

t, °C	M % B
A	
255.0	0
253.5	1.36
252.6	2.23
251.8	3.95

k_A = 11.1 (0.39).

B = $NaNO_3$ (78) (A.)

A	
255.0	0
253.9	1.11
253.3	1.64
252.1	2.82

k_A = 10.6 (0.33).

B = Na_2CO_3 (78) (A.)

A	
255.0	0
253.9	1.01
253.3	1.53

k_A = 10.7 (0.15).

B = Na_2CrO_4 (78) (A.)

A	
255.0	0
254.5	0.50
254.1	0.81
252.2	2.61

k_A = 11.2 (0.25).

B = KCl* (78) (A.)

A (?) Mix.	
255.0	0
253.2	0.93
252.2	1.43

* Reciprocal salt mixtures.

B = $KClO_3$ (78) (A.)

t, °C	M % B
Mix. (?)	
255.0	0
253.8	1.20
252.4	2.54
251.1	3.81

B = KNO_3* (78) (A.)

A (?) Mix.	
255.0	0
253.4	0.76
253.1	0.95
251.9	1.51

* Reciprocal salt mixtures.

B = $CsClO_3$ (78) (A.)

A	
255.0	0
254.6	0.39
253.7	1.15

k_A = 11.8 (0.11).

NaBr

B = NaI (1, 241)

t, °C	M % A
Mix. + liq.	
662	0
653	10
648	20
645	30
648	40
656	50
668	60
684	70
703	80
725	90
748	100

B = $NaNO_2$ (157) (A.)

Mix.	
281.5	0
277.5	0.067
278.5	0.168
280	0.34
282	0.50
283.5	0.67
293	1.68
302	2.72
(307)(?)	3.40

B = KBr (142)

Mix. + liq.	
757	0
730	10
702	20
675	30
655	40
644	50
652	60
675	70
705	80
739	90
768	100

NaI

B = KI (142)

t, °C	M % A
Mix. + liq.	
693 ↓	0
627	30
607	40
592	50
586	56
596	70
613	80
637	90
660	100

Na_2SO_4

B = $NaNO_3$ (7)

B	
310	0
B + A	
300E	5
A	
380	10
515	20
625	30

Decompn. of B above 600°.

B = Na_2CO_3 (2)

Mix. + liq.	
854	0
843	10
835	20
830	30
827	40
833	55
849	70
870	85
892	100
Solid state	
200	95
236	100

B = Na_2CrO_4 (76)

t, °C	M % A	
Mix.		
792	0	0
792		10
795	(30)	20
800	(42)	30
808	(53)	40
819	(65)	50
836	(75)	60
845	(83)	70
858	(90)	80
871	(95)	90
885	100	100
Solid state		
A(α) + A(β) + B(α) + B(β)		
413	0	
350	18–25	
300	40–47	
250	75–79	
235	100	

B = Na_2MoO_4 (35)

v. Fig. 35

B = Na_2WO_4 (35)
v. Fig. 36

B = KCl* (221) (A.)

t, °C	M % A
B (?) Mix.	
771	0
758	1.68
745	3.25
737	4.42
720	5.96
A (?) Mix.	
812	88.54
828	89.56
846	92.62
862	95.26
890	100

* Reciprocal salt mixtures.

B = K_2SO_4 (166)
v. Fig. 37

$Na_2S_2O_7$

B = $Na_2H_2S_2O_8$ (58) (A.)

B	
185.7	0
185.1	2.44
183.2	4.21
B + A	
183.0E*	4.71
A	
185.0	6.92
221.5	11.80
245.0	17.95
326.5	51.90
374.2	79.00
392.7	90.80
400.9	100

* All mixtures give E at 183°.

$NaNO_2$

B = $NaNO_3$ (46)

t, °C	Wt. % B	
Mix.		
284	0	0
270	(5)	10
253	(13)	20
236	(22)	30
225		40
221		50
231	(65)	60
248	(77)	70
266	(86)	80
287	(92)	90
312	100	100

B = KNO_2 (11)

t, °C	M % B
Mix. + liq.	
282	0
260	10
228	25
219	35
248	50
322	70
383	85

B = KNO_2.—(*Continued*)

t, °C	M % B
Mix. + liq.	
440	100
Solid state	
A(α) + A(β)	
160	0
103	10

$NaNO_3$

B = Na_2CO_3 (7)

A	
310	0
A + B	
304E	3
B	
465	10
575	20
655*	30

* Decompn. above 600°.

B = KNO_3 (45, 60, 112)

Mix₁		
310	0	0
290	(4)	10
270	(10)	20
250	(18)	30
228	(32)	40
Mix₁ + Mix₂		
219	47	47
Mix₂		
230	(71)	60
254	(82)	70
282	(89)	80
310	(95)	90
336	100	100
Solid state		
B(α) + B(β)		
85	50–94	
100	94–96	
124	100	

$NaNH_2$

B = KNH_2 (139) (S.)

A	
206.4	0
189.5	6.4
155.0	14.0
145.1	18.2
120.5	25.1
A + AB_2	
92	(33)
AB_2	
100.3	38
110.5	43.2
118.5	54.9
AB_2 + B	
120.0U	64.1
B	
174.0	72.0
231.0	82.4
329.0	100

$NaPO_3$

B = $Na_4P_2O_7$ (187)

t, °C	M % B
A	
987	0
883	10
730	20
A + B (?)	
612E	25.5

B = $NaBO_2$ (134) (A.)

t, °C	M % A
B	
966	0
922	6.6
866	13.8
(864) (?)	21.5
BA	
(774) (?)	39.0
800	49.0
(796) (?)	59.9
(608) (?)	71.9
A	
610	100

$Na_4P_2O_7$

B = $NaBO_2$ (64) (A.)

B	
940	0
918	7.0
910	9.0
B_3A_2	
932	23.0
952	33.0
960	37.5
960	41.0
950	44.0
930	50.0
850	71.5
A	
850	71.5
925	89.5
970	100

B = $K_4P_2O_7$ (11)

t, °C	M % B	
Mix. + liq.		
994	0	
943	10	
905	20	
885	30	
875	40	
892	50	
925	60	
963	70	
1003	80	
1047	90	
1090	100	
Solid state		
Unmixing		
505*	50	
500	37	55
450	25	67
375	18	75

* Probable formation of AB.

B = $K_4P_2O_7$.—(*Continued*)

t, °C	M % B
A(α) + A(β)	
395	0
180	4
B(α) + B(β)	
175	90
275	100

$NaAsO_3$

B = $KAsO_3$ (15)

Mix.		
615	0	0
563	(6)	10
526	(10)	20
505	(12)	30
496	13	40
497	50	50
510	60	60
530	70	70
562	80	80
602	90	90
650	100	100
Solid state		
B(α) + B(β)		
380	90	
450	100	

Na_3AsO_4

B = K_3AsO_4 (15)

Mix. + liq.		
1260	0	
1212	10	
1178	20	
1160	30	
1156	35	
1185	50	
1210	60	
1236	70	
1260	80	
1285	90	
1310	100	
Solid state		
Unmixing		
464	50*	
460	34	57
450	23	70
440	5	8
A(α) + A(β)		
410	0	
370	6–15	

* Probable comp. formation.

$Na_4As_2O_7$

B = $K_4As_2O_7$ (15)
v. Fig. 38

Na_2CO_3

B = Na_2CrO_4 (220, 221) (A.)

A	
860	0
849	3.34
843	5.38
836	7.15

B = Na_2CrO_4.—(*Continued*)

t, °C	M % B
A	
826	9.51
820	11.55

k_A = 32 (1.2).

B = KCl* (221, 222)

t, °C	M % A
B (?) Mix.	
771	0
758	1.75
745	3.11
731	5.43
A (?) Mix.	
799	89.11
821	92.13
842	96.61
860	100

* Reciprocal salt mixtures.

B = K_2CO_3 (11, 172)

t, °C	M % B
Mix. + liq.	
854	0
790	10
740	20
712	30
704	40
715	50
735	60
770	70
810	80
855	90
896	100
Solid state	
Unmixing	
480	36
490*	50
455	60
A(α) + A(β)	
430	0
B(α) + B(β)	
405	100

* Probable formation of AB.

B = K_2CrO_4* (220, 221) (A.)

A (?) Mix.	
860	0
839	2.82
831	4.17
811	6.48

* Reciprocal salt mixtures.

NaCN

B = KCN (256)

Mix₁		
561.7	0	0
548	5	10
524	14	20
508	28	30

B = KCN.—(*Continued*)

t, °C	M % B	
Mix₁ + Mix₂		
502	40	40
Mix₂		
510	60	50
533	79	60
555	88	70
578	94	80
600	97	90
622	100	100

At 260° Mix. → A + B.

NaCNS

B = KCNS (264)

t, °C	M % A
B(α)	
179	0
160	10
B(α) + B(β)	
142	18
B(β) + A	
123.5E	30
A	
188	40
225	50
251	60
272	70
290	80
307	90
323	100

At 102° AB_3 forms.

Na_2CrO_4

B = K_2CO_3* (220, 221) (A.)

B (?) Mix.	
909	0
889	2.56
884	3.51
854	7.47
833	9.96

* Reciprocal salt mixtures.

B = K_2CrO_4 (11, 76)
v. Fig. 39

Na_2MoO_4

B = Na_2WO_4 (35)
v. Fig. 41

B = K_2MoO_4 (11)
v. Fig. 40

Na_2WO_4

B = K_2WO_4 (11, 149)
v. Fig. 42

$NaBO_2$

B = KBO_2 (134)

t, °C	M	% A
Mix₁		
947	0	0
935	4	10
920	10	20
900	16	30
875	25	40
Mix₁ + Mix₂		
850	55	55
Mix₂		
865	74	65
905	88	80
940	95	90
966	100	100
Solid state Unmixing		
553	55	
530	46	64
500	42	69

KOH

B = KF (235)

t, °C	M	% A
Mix.		
857	0	0
830	4	10
797	10	20
758	18	30
714	24	40
667	39	50
617	50	60
566	60	70
510	71	80
450	83	90
380	100	100
Solid state		
A(α) + A(β)		
138	30	
153	50	
180	70	
227	90	
265	100	

B = KCl (235)
v. Fig. 43

B = KBr (235)

t, °C	M	% A
B		
760	0	
658	10	
590	20	
513	35	
418	50	
343	60	
B + Mix.		
300E	79	65
Mix.		
319	82	70
350	89	80
370	96	90
380	100	100
Solid state		
A(α) + A(β)		
195	0–93	
220	92–94	
265	100	

B = KI (235)

t, °C	M % A
B	
695	0
655	10
583	25
490	40
379	55
300	65
B + A(β)	
250E	72
A(α) + A(β)	
265	74
A(α)	
303	80
350	90
380	100

B = RbOH (111, 171)
v. Fig. 44

KF

B = KCl (201)

t, °C	M % A
B	
772	0
745	10
692	25
650	35
B + A	
605E	45
A	
663	55
713	65
760	75
800	85
859	100

B = KBr (143)

t, °C	M % A
B	
748	0
720	10
682	20
635	30
B + A	
580E	40
A	
642	50
750	70
826	90
851	100

B = KI (219) (A.)

t, °C	M % B
(?)	
885	0
580*	70
705	100

* Minimum t_L.

B = K_2SO_4 (128)

t, °C	M % A
B(α)	
1074	0
1033	10
987	20
939	30

B = K_2SO_4.—(*Continued*)

t, °C	M % A
B(α) + BA(α)	
883E	42
BA(α)	
887	50
878	60
852	70
BA(α) + A	
786E	83
A	
820	90
867	100
Solid state	
B(α) + B(β)	
599	0-50
BA(α) + BA(β)	
578	20-83

B = KPO_3 (4)

t, °C	M % B
A	
855	0
802	10
A + A_2B(α)	
740E	17.5
A_2B(α)	
774	25
A_2B(α) + AB(α)	
793UE	33.3
AB(α)	
847	40
880	50
845	60
680	75
AB(α) + B	
604E	82.5
B	
685	90
798	100
Solid state	
A_2B(α) + A_2B(β)	
540	0–50
AB(α) + AB(β)	
450	34–100

B = K_3PO_4 (4)

t, °C	M % B
A	
855	0
818	10
A + B	
766E	20
B	
865	30
950	40
1020	50
1085	60
1200	80
1340	100

At 700° there is a transformation of an unstable undetermined comp.

B = $K_4P_2O_7$ (4)

t, °C	M % B
A	
855	0
793	10

B = $K_4P_2O_7$.—(*Continued*)

t, °C	M % B
A + B	
730E	20
B	
792	30
850	40
955	60
997	70
1050	85
1088	100

B = K_2CO_3 (8)

t, °C	M % A
B	
896	0
858	10
815	20
770	30
720	40
B + BA	
688E	46
BA	
688	50
686	55
BA + A	
682E	61.5
A	
725	70
775	80
817	90
855	100

KCl

B = KBr (17, 264)

t, °C	M % B
Mix. + liq.	
740	0
736	20
735	30
734	40
736	50
738	60
744	70
752	80
762	90
771	100

B = KI (17, 264)

t, °C	M	% B
Mix₁		
780	0	0
746	7	10
705	14	20
653	24	30
600	37	40
586	47	50
Mix₁ + Mix₂		
584	55	55
Mix₂		
587	66	60
599	74	70
638	86	80
668	96	90
680	100	100

B = KI.—(*Continued*)

t, °C	M % B
Solid state Unmixing	
595	10
577	20
547	30
512	40
496	55
498	60
505	70
512	80

B = K_2SO_4 (124)

t, °C	M % A
B(α)	
1074	0
1005	10
882	25
720	50
B + A	
690E	58
A	
715	70
735	80
753	90
778	100
Solid state	
B(α) + B(β)	
587	0–70

k_A = 27.0 (1.0) (221) (A.).

B = KNO_3 (200) (A.)

t, °C	M % B
B	
344	0
343	1.41
341	3.14
336	6.23
B + A	
331.5E	7.44
A	
339	9.08
357	13.25
371	16.17

B = KPO_3 (3)

t, °C	M	% B
Mix₁		
774	0	0
754	(2)	10
740	(3)	20
735	(3)	30
724	(4)	40
708	(5)	50
683	(7)	60
654	(10)	70
Mix₁ + Mix₂		
620E	13	80
	95	80
Mix₂		
705	(97)	90
798	100	100

B = K_3PO_4 (3)

t, °C	M % B
A	
774	0
755	10
A + B	
720E	15
B	
795	25
900	40
975*	50
1340	100

* Sublimation above 1100°.

B = $K_4P_2O_7$ (3)

t, °C	M % B
A	
774	0
748	10
A + B	
735E	15
B	
810	25
895	40
945	50
980	60
1005	70
1045	85
1090	100

B = K_2CO_3 (8)

t, °C	M % A
B	
896	0
860	10
825	20
785	30
745	40
704	50
B + A	
636E	65
A	
656	70
774	100
B (220, 221) (A.)	
909	0
895	4.07
878	9.52
870	11.90
855	15.54
846	18.35

k_A = 25 (1.2.)

B = KCN (256)

t, °C	M	% B
Mix.		
775	0	0
753	6	10
737	12	20
720	20	30
703	28	40
687	36	50
674	44	60
660	54	70
647	65	80
635	77	90
622	100	100

B = $K\ CrO_4$ [277]

t, °C	M % B
A	
790	0
745	10
703	20
665	30
A + B(β)	
656E	32.5
B(β) + B(α)	
673	37
B(α)	
742	50
805	60
860	70
917	80
957	90
984	100

k_A = 25.0 (1.2) [221] (A.).

B = $K_2Cr_2O_7$ [277]

t, °C	M % A
Mix. + liq.	
395	0
377	10
370	20
Mix. + A	
366E	28
A	
380	30
443	40
510	50
578	60
640	70
688	80
738	90
790	100

B = RbCl [278]

Mix.		
726	0	0
729	22	10
732	40	20
735	52	30
739	62	40
743	70	50
749	77	60
756	84	70
765	90	80
776	96	90
790	100	100

B = CsCl [278]

Mix_1		
646	0	0
635	5	10
625	12	20
620	18	30
$Mix_1 + Mix_2$		
616	34.5	34.5
Mix_2		
622	45	40
635	56	50
655	65	60
685	75	70
720	85	80
755	93	90
790	100	100

B = CsCl.—(*Continued*)

t, °C	M % A
Solid state	
B(α) + B(β)	
456	0
447	5
440	10

KBr

B = **KI** [17, 264]

Mix_1		
748	0	0
722	7	10
688	15	20
640	26	30
605	36	40
$Mix_1 + Mix_2$		
589	50	50
Mix_2		
608	67	60
632	79	70
653	83	80
668	94	90
680	100	100

KI

B = K_2SO_4 [219] (A.)

t, °C	M % B
(?)	
705	0
670*	13
1050	100

* Minimum t_L.

K_2SO_4

B = KNO_3 [10] (A.)

t, °C	M % A
B(α)	
336	0
B(α) + A	
332E	3
A	
410	5
530	10
665*	20
1066	100
Solid state	
B(α) + B(β)	
124	0–52

* Decomp. at higher temps.

B = K_2CO_3 [2]

Mix. + liq.	
896	0
903	10
912	20
922	30
933	40
946	50
966	60
992	70
1020	80
1045	90
1066	100

B = K_2CO_3.—(*Continued*)

t, °C	M % A
Solid state	
A(α) + A(β)	
635	70
608	80
592	90
583	100

B = K_2CrO_4 [93] (A.)

Mix. + liq.	
978	0
985	20
1000	40
1010	50
1025	60
1045	80
1066	100
Solid state	
Transition curve A(α) + B(α) to A(β) + B(β)	
666	0
655	20
640	40
625	60
602	80
585	100

B = K_2MoO_4 [5]

Mix. + liq.	
926	0
921	15
920	25
926	40
940	50
961	60
985	70
1024	85
1066	100
Solid state	
A(α) + A(β)	
462	30
503	50
555	80
583	100
B(α) + B(β)	
475	0
460	7

B = K_2WO_4 [6]

Mix. + liq.	
894	0
888	10
884	20
895	40
912	50
935	60
993	80
1065	100
Solid state	
A(α) + A(β)	
483 ↓	50
583	100
B(α) + B(β)	
575	0
525	14

$K_2S_2O_7$

B = $K_2H_2S_2O_8$ [58] (A.)

t, °C	M % A
B	
213.8	0
213.2	1.65
212.0	4.97
211.5	9.14
B + A(γ)	
201.3E*	12.42
A(γ)	
202.5	14.53
212.6	17.28
220.0	21.66
224.0	25.15
223.6	26.40
A(β)	
236.5	32.80
254.0	39.97
264.5	45.34
285.0	55.36
308.2	69.60
A(α)	
328.0	78.82
380.0	92.00
401.7	97.19
414.2	100

* All mixtures give E at 201°.

KNO_2

B = KNO_3 [158]

Mix. + liq.	
336	0
323	10
320	20
328	30
353	50
386	70
421	90
(440)	100
Solid state	
B(α) + B(β)	
120	0
95	10
90	15

KNO_3

B = K_2CO_3 [7]

t, °C	M % B
A(α)	
336	0
A(α) + B	
326E	4
B	
430	10
545	20
630	30
700*	42
(895)	100
Solid state	
A(α) + A(β)	
124	0–42

* A decomposes above 700°.

B = K_2CrO_4 [99] (A.)

t, °C	M % A
B	
971	0
B + A	
295E	98
A	
320	100

KPO_3

B = $K_4P_2O_7$ [187]

Mix_1		
823	0	0
707	(6)	10
$Mix_1 + Mix_2$		
615E	10	19
	61	19
Mix_2		
700	(65)	30
810	(72)	40
890	(79)	50
955	(85)	60
1035	(93)	80
1092	100	100

B = KBO_3 [134] (A.)

B	
947	0
900	10
825	20
B + BA	
770E	23
BA	
835	30
875	40
885	50
860	55
BA + A	
680E	86
A	
725	90
810	100

K_2CO_3

B = K_2CrO_4 [220, 221] (A.)

t, °C	M % B
A	
909	0
903	2.35
895	5.94
886	9.33
879	12.20

KCN

B = **KCNO** [148] (A.)

A + B	
282E	82.44

KCNS

B = **RbCNS** [264]

v. Fig. 45

K_2CrO_4

B = $K_2Cr_2O_7$ [2, 93]

t, °C	M % B
A(α)	
971	0
905	30
798	60
A(α) + A(β)	
666	81
A(β)	
555	90
A(β) + B	
393E	>99
B	
396	100

B = K_2MoO_4 [6]

t, °C	M % A
Mix. + liq.	
926	0
925	10
925	20
926	30
929	40
935	50
942	60
950	70
958	80
969	90
978	100
Solid state	
A(α) + A(β)	
470	35
560	60
620	80
666	100
B(α) + B(β)	
475	0
465	5

B = K_2WO_4 [6]

Mix. + liq.	
894	0
898	20
907	40
923	60
945	80
978	100
Solid state	
A(α) + A(β)	
490 ↓	40
666	100
B(α) + B(β)	
595	0
530	10

$K_2Cr_2O_7$

B = $K_2Mo_2O_7$ [6]

t, °C	M % B
Mix. + liq.	
398	0
410	20
424	40
440	60
460	80
484	100

$K_2Cr_2O_7$.—(*Continued*)

B = $K_2W_2O_7$ (6)

t, °C	M % B
Mix. + liq.	
398	0
390	10
384	15
385	20
401	30
446	50
486	70
518	85
555	100

K_2MoO_4

B = K_2WO_4 (6)

t, °C	M % B
Mix. + liq.	
926	0
920	20
913	40
901	60

K_2WO_4.—(*Continued*)

t, °C	M % B
Mix. + liq.	
896	80
894	100
Solid state	
A(α) + A(β)	
475	0–16
B(α) + B(β)	
540	75
575	100

$K_2Mo_2O_7$

B = $K_2W_2O_7$ (6)

t, °C	M % B
Mix. + liq.	
484	0
500	20
510	40
522	60
538	80
555	100

RbCl

B = CsCl (278)

t, °C	M % A	
Mix.		
646	0	0
640		5
635		15
640	40	25
645	47	35
658	63	50
670	73	60
684	82	70
699	89	80
715	96	90
726	100	100
Solid state		
B(α) + B(β)		
452		0
442		5
433		10

THREE-COMPONENT SYSTEMS

Standard Arrangement (*v.* Vol. III, p. viii)

A = NH_4NO_3; B = NH_4Cl; C = $LiNO_3$ (196) (A.)

t_L, °C	M % A	M % B	M % C
A/C = 96.30/3.70			
A(δ)			
163.5	96.30	0	3.70
147.0	90.73	5.79	3.48
135.4	87.26	9.39	3.35
A(γ)			
118.1	81.07	15.82	3.11
111.3	77.28	19.76	2.96
98.8	72.17	25.06	2.77
92.6	70.01	27.31	2.68
B			
98.0	68.26	29.12	2.62
105.0	65.82	31.66	2.52
112.5	63.79	33.76	2.45
A/C = 94.25/5.75			
A(δ)			
154.0	94.25	0	5.75
148.7	90.39	4.10	5.51
140.3	85.17	9.63	5.20
137.3	83.09	11.84	5.07
132.0	79.23	15.94	4.83
130.5	78.38	16.84	4.78
B			
137.0	76.28	19.07	4.65
154.0	73.91	21.58	4.51
A/C = 92.99/7.01			
A(δ)			
158.9	92.99	0	7.01
147.5	88.49	4.84	6.67
128.0	83.42	10.29	6.29
A(γ)			
117.0	80.14	13.81	6.05
106.8	75.37	18.94	5.69
98.0	71.77	22.82	5.41
92.9	69.48	25.28	5.24

t_L, °C	M % A	M % B	M % C
A/C = 92.99/7.01			
B			
94.0	67.51	27.40	5.09
101.8	64.16	31.00	4.84
106.8	61.53	33.83	4.64
125.7	56.32	39.43	4.25
140.0	53.24	42.51	4.01
A/C = 89.32/10.68			
A(δ)			
153.5	89.32	0	10.68
147.0	87.62	1.90	10.48
138.5	84.75	5.12	10.13
129.3	82.19	7.98	9.83
A(γ)			
120.7	79.54	10.95	9.51
113.6	76.73	14.10	9.17
98.0	70.38	21.21	8.41
89.3	67.04	24.94	8.02
B			
88.2	66.10	26.00	7.90
92.8	64.67	27.60	7.73
97.0	62.34	30.21	7.45
109.3	57.97	35.10	6.93
A/C = 88.59/11.41			
A(δ)			
134.3	88.59	0	11.41
131.8	86.65	2.19	11.16
129.4	84.73	4.35	10.92
123.9	81.47	8.03	10.50
A(γ)			
118.8	78.17	11.75	10.07
116.2	76.73	13.39	9.88
LiCl			
121.8	75.30	15.00	9.70
130.7	74.01	16.46	9.53
149.0	71.57	19.21	9.22
157.0	70.51	20.53	8.96

t_L, °C	M % A	M % B	M % C
A/C = 83.01/16.99			
A(γ)			
121.0	83.01	0	16.99
118.3	81.57	1.74	16.69
112.1	77.56	6.58	15.86
108.0	75.02	9.63	15.35
106.0	73.88	11.00	15.12
B			
109.0	72.75	12.36	14.89
119.0	71.64	13.70	14.66
129.8	70.21	15.43	14.36
138.0	68.79	17.14	14.07
A/C = 77.52/22.48			
A(γ)			
108.0	77.52	0	22.48
105.1	75.41	2.73	21.86
102.5	73.44	5.27	21.29
99.8	71.50	7.78	20.72
96.5	69.58	10.25	20.17
B			
98.0	69.16	10.79	20.05
103.8	68.43	11.74	19.83
118.8	66.67	14.01	19.32
136.0	64.93	16.25	18.82
A/C = 72.12/27.88			
A(γ)			
97.0	72.12	0	27.88
96.1	70.68	2.00	27.32
91.0	69.26	3.98	26.76
88.0	67.95	5.79	26.26
86.2	66.65	7.59	25.76
B			
89.5	65.17	9.64	25.19
101.2	64.00	11.26	24.74
118.0	62.18	13.79	24.03
141.1	59.18	17.95	22.87
155.5	57.79	19.87	22.34
A/C = 66.80/33.20			
C			
110.0	66.80	0	33.20
107.8	65.76	1.56	32.68
101.0	62.78	6.03	31.19
97.7	61.51	8.34	30.15
B			
98.3	59.60	10.78	29.62
112.0	58.10	13.03	28.87
140.0	54.89	17.84	27.27
150.0	53.78	19.50	26.72
A/C = 64.18/35.82			
C			
116.0	64.18	0	35.82
108.7	61.38	4.35	34.27
106.2	59.88	6.69	33.43
LiCl			
103.7	58.92	8.19	32.89
104.0	58.48	8.86	32.66
102.5	57.71	10.08	32.21
101.8	57.03	11.14	31.83
B			
109.3	56.09	12.60	31.31
123.0	54.08	15.73	30.19
129.3	53.26	17.02	29.72

t_L, °C	M % A	M % B	M % C
A/C = 61.56/38.44			
C			
124.7	61.56	0	38.44
119.5	59.58	3.23	37.19
112.3	57.21	7.07	35.72
110.0	56.54	8.16	35.30
LiCl			
110.0	56.21	8.70	35.09
109.0	54.97	10.71	34.32
109.0	53.75	12.69	33.56
B			
113.3	53.11	13.74	33.15
115.0	52.69	14.41	32.90
134.0	50.80	17.48	31.72
A/C = 56.40/43.60			
C			
137.0	56.40	0	43.60
132.3	53.90	4.44	41.66
128.7	52.06	7.70	40.24
126.7	50.71	10.10	39.19
LiCl			
125.5	49.88	11.56	38.56
123.7	49.07	13.00	37.93
120.7	48.34	14.30	37.36
B			
122.3	47.54	15.71	36.75
129.0	46.89	16.86	36.25
142.0	45.40	19.51	35.09

A = NH_4NO_3; B = NH_4Cl; C = NaCl (196) (A.)

t_L, °C	M % A	M % B	M % C
A/B = 97.31/2.69			
A			
165.2	97.31	2.69	0
B			
128.3	86.77	2.39	10.81
133.1	85.05	2.34	12.61
135.7	84.03	2.31	13.64
145.1	80.87	2.22	16.91
A/B = 94.00/6.00			
A			
164.0	94.00	6.00	0
148.8	91.50	5.84	2.66
137.5	89.03	5.68	5 29
A + B			
128.8E	86.59	5.53	7.88
B			
135.8	84.19	5.37	10.44
144.9	81.81	5.22	12.97
156.2	79.47	5.07	15.46
A/B = 89.98/10.02			
A			
155.4	89.98	10.02	0
142.4	87.63	9.74	2.63
131.4	85.30	9.48	5.22
A + B			
130.0E	(?)	(?)	(?)
B			
138.0	82.98	9.22	7.79
144.0	81.83	9.11	9.06
155.7	79.59	8.84	11.57
163.0	78.45	8.73	12.82

A = NH_4NO_3; B = NH_4Cl; C = $NaNO_3$ (163) (A.)

t_L, °C	M % A	M % B	M % C
A/B = 82.91/17.09			
A + B			
141.0E	82.91	17.09	0
B			
138.1*	81.43	16.79	1.78
135.7†	79.65	16.42	3.93
133.0‡	77.87	16.05	6.08
133.0§	76.70	15.81	9.49
134.5‖	73.95	15.25	10.80
134.7‖	70.22	14.48	15.30
134.0‖	67.08	13.82	19.10
133.4	65.06	13.40	21.54
NaCl			
133.5	64.52	13.30	22.18
140.4	62.41	12.86	24.73
147.8	60.13	12.40	27.47
165.4	56.02	11.53	32.45
A/C = 80.85/19.15			
A + C			
121.0E	80.85	0	19.15
A			
117.5	78.42	3.00	18.58
114.2¶	76.04	5.94	18.02
A + B + C			
112.5E	74.76	7.53	17.71
B			
122.5¶	72.85	9.88	17.27
131.5¶	70.40	12.92	16.68
139.5	67.03	17.09	15.88
148.5	65.34	19.18	15.48
159.5	63.80	21.10	15.10

* This mixture gives E(A + B) at 137.0°C.
† At 132.2°C.
‡ At 129.4°C.
§ at 127.6°C.
‖ Ternary E(A + B + C) at 112.2°C.
¶ This mixture gives ternary E(A + B + C) at 112.5°C.

A = NH_4NO_3; B = NH_4Cl; C = KCl (200) (A.)

t_L, °C	M % A	M % B	M % C
A/B = 97.36/2.64			
A			
165.3	97.36	2.64	0
155.7	94.04	2.54	3.42
147.1	90.91	2.47	6.62
138.1	88.00	2.39	9.61
Mix. (NH_4NO_3 + KNO_3)			
134.7	86.54	2.36	11.10
B			
142.1*	85.23	2.31	12.46
155.0†	84.40	2.29	13.31
165.7‡	83.90	2.28	13.82
A/B = 94.13/5.87			
A			
159.3	94.13	5.87	0
150.0	90.94	5.68	3.38
140.9	87.96	5.47	6.57
137.2	86.52	5.41	8.07
A/B = 94.13/5.87			
B			
135.1	85.45§	5.33	9.22
137.4	85.15	5.31	9.54
147.2	84.46	5.27	10.27
160.1	83.30	5.19	11.51
168.0	82.50	5.15	12.35
A/B = 89.88/10.12			
A			
152.8	89.88	10.12	0
146.3	87.60	9.86	2.54
139.5	85.44	9.63	4.93
B			
146.6‖	83.58	9.41	7.01
158.1¶	82.70	9.34	7.96
166.8**	82.00	9.24	8.76
177.0††	81.24	9.15	9.61
A/B = 86.42/13.58			
A			
147.2	86.42	13.58	0
142.0	84.69	13.31	2.00
139.6	83.86	13.17	2.97
B			
144.8‡‡	83.03	13.04	3.93
148.2§§	82.62	12.98	4.40
158.7‖‖	81.83	12.85	5.32
165.5¶¶	81.43	12.79	5.78
A/B = 85.74/14.26			
A			
146.3	85.74	14.26	0
141.9	81.63	13.59	4.78
137.2	77.90	12.96	9.14
Mix. (A + C)			
135.8	76.17	12.68	11.15
139.1	74.51	12.39	13.10
146.1	71.36	11.87	16.77
168.5	66.60	11.08	22.32
A/B = 82.91/17.09			
A + B			
141.1E	82.91	17.09	0
B			
145.9***	82.08	16.92	1.00
154.6†††	81.28	16.74	1.98
165.0‡‡‡	80.48	16.59	2.93
173.7§§§	79.68	16.43	3.89

* This mixture gives E[B + Mix. (NH_4NO_3 + KNO_3)] at 134.7°C.
† At 137.0°C.
‡ At 139.4°C.
§ Mixtures 85.45–82.50 M % A give a ternary E[A + B + Mix. (NH_4NO_3 + KNO_3)] at 134.5°C.
‖ This mixture gives E(A + B) at 136.6°C.
¶ At 137.0°C.
** At 136.8°C.
†† At 135.4°C.
‡‡ This mixture gives E(A + B) at 138.8°C.
§§ At 137.2°C.
‖‖ At 138.2°C.
¶¶ At 137.4°C.
*** This mixture gives E(A + B) at 141.0°C.
††† At 140.0°C.
‡‡‡ At 138.4°C.
§§§ At 137.4°C.

A = NH_4NO_3; B = NH_4Cl; C = KNO_3 (200) (A.)

t_L, °C	M % A	M % B	M % C
A/B = 82.91/17.09			
A + B			
141.1E	82.91	17.09	0
B			
138.0	79.94	16.47	3.59
139.0*	78.51	16.19	5.30
142.7†	75.86	15.62	8.52
146.6‡	73.32	15.12	11.56
151.8§	69.87	14.40	15.73
156.8‖	67.73	13.95	18.32
160.8¶	66.38	13.69	19.93
A/C = 88.92/11.08			
A + Mix. (A + C)			
157.5E₁	88.92	0	11.08
A			
153.0	86.91	2.26	10.83
143.7	81.99	7.80	10.21
139.6	79.17	10.97	9.86
A + Mix. (A + C) + B			
134.5E	76.54	13.92	9.54
B			
139.8**	75.55	15.04	9.41
149.5**	74.57	16.14	9.29
154.6**	74.09	16.68	9.23
A/C = 86.90/13.10			
Mix. (A + C)			
160.0	86.90	0	13.10
153.4	83.74	3.64	12.62
149.7	82.07	5.56	12.37
144.4	79.90	8.06	12.04
136.8**	76.24	12.26	11.50
B			
135.9**	75.59	13.01	11.40
143.6**	74.14	14.68	11.18
156.6**	72.93	16.07	11.00
161.9	72.29	16.81	10.90
166.2	71.68	17.52	10.80
A/C = 84.34/15.66			
Mix. (A + C)			
167.9	84.34	0	15.66
164.8	83.05	1.53	15.42
157.0	80.90	4.08	15.02
147.9	77.14	8.54	14.32
143.8	75.70	10.25	14.05
B			
141.7**	74.30	11.90	13.80
142.8**	73.62	12.72	13.66
145.9**	72.32	14.26	13.42

* This mixture gives E(A + B) at 136.8°C.
† At 134.5°C.
‡ This mixture gives E_1[B + Mix. (A + C)] at 134.0°C.
§ At 142.0°C.
‖ At 146.2°C.
¶ At 152.8°C.
** This mixture gives ternary E[A + Mix. (A + B) + C] at 134.5°C.

A = NH_4NO_3; B = $(NH_4)_2SO_4$; C = $NaNO_3$ (197) (A.)

t_L, °C	M % A	M % B	M % C
A/C = 95.28/4.72			
A			
156.1	95.28	0	4.72
Mix. (A + B)			
158.5	94.76	0.55	4.69
164.6	93.29	2.09	4.62
168.1	92.22	3.22	4.56
A/C = 90.54/9.46			
A			
145.0	90.54	0	9.46
Mix. (A + B)			
147.3	90.04	0.55	9.41
152.1	88.81	1.91	9.28
156.0	87.90	2.91	9.19
157.2	87.27	3.61	9.12
A/C = 85.76/14.24			
A			
132.1	85.76	0	14.24
Mix. (A + B)			
134.8	85.18	0.67	14.15
139.0	84.06	1.98	13.96
140.0	83.47	2.67	13.86
140.4	83.25	2.92	13.83
A/C = 83.36/16.64			
A			
125.8	83.36	0	16.64
Mix. (A + B)			
128.6	82.85	0.61	16.54
132.8	81.86	1.79	16.34
139.0	80.49	3.44	16.07
144.9	79.05	5.18	15.77
A/C = 80.95/19.05			
A			
121.6	80.95	0	19.05
121.0	80.74	0.27	18.99
Mix. (A + B)			
122.9	80.51	0.55	18.94
123.7	80.30	0.80	18.90
126.1	79.25	2.11	18.64
129.2	78.27	3.31	18.42
A/C = 76.12/23.88			
C			
134.0	76.12	0	23.88
131.6	75.65	0.62	23.73
127.8	74.61	1.99	23.40
122.5	73.64	3.26	23.10
119.9	73.34	3.65	23.01
Na_2SO_4			
119.0	72.90	4.23	22.87
123.0	72.40	4.88	22.72
134.0	71.94	5.49	22.57
A/C = 71.26/28.74			
C			
147.7	71.26	0	28.74
144.7	70.47	1.11	28.42
138.4	69.58	2.35	28.07
132.0	68.43	3.98	27.59
Na_2SO_4			
126.0	67.52	5.25	27.23
132.1	67.12	5.81	27.07

A = NH_4NO_3; B = $(NH_4)_2SO_4$; C = KNO_3 (199) (A.)

t_L, °C	M % A	M % B	M % C
A/C = 96.81/3.19			
A			
166.1	96.81	0	3.19
Mix. (A + B)			
168.4	96.43	0.39	3.18
170.1	95.84	1.00	3.16
173.9	94.87	2.01	3.12
176.1	93.80	3.11	3.09
177.0	93.02	3.92	3.06
178.2	92.36	4.60	3.04
A/C = 93.57/6.43			
A			
162.6	93.57	0	6.43
Mix. (A + B)			
164.6	93.22	0.37	6.41
167.2	92.67	0.96	6.37
171.0	91.62	2.08	6.30
173.7	90.52	3.25	6.23
175.0	89.18	4.69	6.13
A/C = 91.09/8.91			
A			
159.8	91.09	0	8.91
Mix. (A + B)			
163.4	90.55	0.60	8.85
168.6	89.27	2.01	8.72
171.1	88.33	3.03	8.64
172.6	87.60	4.32	8.52
A/C = 88.93/11.07			
A + Mix. (A + C)			
157.2	88.93	0	11.07
Mix. [$(NH_4)_2SO_4$ + K_2SO_4]			
159.3	88.70	0.25	11.05
162.2	88.30	0.72	10.98
164.9	87.70	1.38	10.92
166.6	87.06	2.10	10.84
169.9	85.75	4.23	10.68
A/C = 86.05/13.95			
Mix. (A + C)			
162.8	86.05	0	13.95
162.1	85.69	0.42	13.89
Mix. (A + C) + Mix. [$(NH_4)_2SO_4$ + K_2SO_4]			
160.4E	85.28	0.90	13.82
Mix. [$(NH_4)_2SO_4$ + K_2SO_4]			
161.1	85.07	1.14	13.79
162.8	84.61	1.68	13.71
165.6	83.80	2.62	13.58
168.0	82.97	3.58	13.45
169.3	82.11	4.58	13.31
A/C = 84.34/15.66			
Mix. (A + C)			
167.4	84.34	0	15.66
166.1	84.06	0.34	15.60
165.2	83.75	0.71	15.54
162.9	82.90	1.72	15.38
Mix. [$(NH_4)_2SO_4$ + K_2SO_4]			
162.7	82.68	1.98	15.34
163.0	82.56	2.12	15.32
164.3	82.14	2.62	15.24
166.2	81.55	3.32	15.13
167.5	81.14	3.80	15.06
A/C = 83.05/16.95			
Mix. (A + C)			
171.4	83.05	0	16.95
170.1	82.70	0.42	16.88
167.8	82.14	1.10	16.76
164.5	81.33	2.08	16.59
163.7	80.85	2.65	16.50
Mix. [$(NH_4)_2SO_4$ + K_2SO_4]			
163.7	80.72	2.81	16.47
164.4	80.32	3.29	16.39
166.7	79.67	4.08	16.25
A/C = 81.75/18.25			
Mix. (A + C)			
174.5	81.75	0	18.25
172.1	81.16	0.73	18.11
168.0	80.23	1.86	17.91
165.7	79.43	2.84	17.73
165.0	79.11	3.24	17.65
Mix. (A + C) + Mix. [$(NH_4)_2SO_4$ + K_2SO_4]			
164.9E	78.75	3.68	17.57
Mix. [$(NH_4)_2SO_4$ + K_2SO_4]			
165.7	78.42	4.08	17.50

A = NH_4NO_3; B = NaCl; C = $NaNO_3$ (196) (A.)

t_L, °C	M % A	M % B	M % C
A/C = 95.00/5.00			
A			
156.0	95.00	0	5.00
145.3	92.42	2.72	4.86
134.6	89.86	5.40	4.74
123.3	87.34	8.06	4.60
NH_4NO_3 + NH_4Cl			
120.0E	(?)	(?)	(?)
NH_4Cl			
124.0	84.89	10.65	4.46
132.5	82.42	13.24	4.34
140.4	80.01	15.78	4.21
B			
146.4	79.40	16.41	4.19
154.5	78.83	17.03	4.14
160.0	78.24	17.64	4.12
171.3	77.64	18.27	4.09
A/C = 91.00/9.00			
A			
146.0	91.00	0	9.00
135.5	88.52	2.74	8.74
124.5	86.08	5.42	8.50
NH_4NO_3 + NH_4Cl			
114.7E	83.66	8.09	8.25
NH_4Cl			
124.0	81.27	10.70	8.03
133.5	78.93	13.27	7.80
136.5	78.35	13.91	7.74
B			
142.2	77.75	14.55	7.70
157.7	76.62	15.81	7.57
A/C = 87.38/12.62			
A			
136.5	87.38	0	12.62
130.0	86.02	1.55	12.43
123.0	84.43	3.37	12.20
113.5	81.83	6.36	11.81
NH_4NO_3 + $NaNO_3$ + NH_4Cl			
113.0E	81.46	6.77	11.77
A/C = 87.38/12.62			
C			
115.0	80.98	7.32	11.70
128.0	77.76	11.00	12.24
134.5	76.06	12.96	10.98
B			
144.0	75.54	13.55	10.91
147.0	75.26	13.87	10.87
164.5	74.34	14.92	10.74
A/C = 83.83/16.17			
A			
127.0	83.83	0	16.17
119.3	81.54	2.74	15.72
A + C			
116.0E	(?)	(?)	(?)
C			
118.2	79.19	5.54	15.27
127.4	77.03	8.11	14.86
133.8	74.84	10.73	14.43
B			
158.1	72.67	13.32	14.01
167.3	72.13	13.96	13.91
A/C = 80.85/19.15			
A + C			
121.0E	80.85	0	19.15
A			
120.7	80.30	0.69	19.01
A + C			
119.5E	79.50	1.68	18.82
C			
121.5*	78.67	2.69	18.64
126.0†	77.64	3.98	18.38
133.2‡	75.61	6.48	17.91
140.4‡	73.72	8.83	17.45
153.0‡	71.11	12.05	16.84
164.4‡	70.59	12.69	16.72
176.2‡	69.64	13.86	16.50
A/C = 76.02/23.98			
C			
132.0	76.02	0	23.98
138.4	73.92	2.75	23.33
144.9	71.85	5.47	22.68
151.2	69.82	8.14	22.04
160.2	68.04	10.49	21.47

* This mixture gives E(A + C) at 118.0°C.
† At 115.5°C.
‡ E(A + B + C) at 112.2°C.

A = NH_4NO_3; B = Na_2SO_4; C = $NaNO_3$ (196) (A.)

t_L, °C	M % A	M % B	M % C
A/C = 85.76/14.24			
A			
132.0	85.76	0	14.24
Mix. (NH_4NO_3 + $(NH_4)_2SO_4$)			
131.0	85.27	0.57	14.16
128.5	84.28	1.72	14.00
123.8	82.86	3.38	13.76
121.5	82.14	4.22	13.64
A/C = 84.90/15.10			
A			
125.8	84.90	0	15.10
Mix. (NH_4NO_3 + $(NH_4)_2SO_4$)			
124.2	84.26	0.75	14.99
121.3	83.30	1.88	14.82
A/C = 84.90/15.10			
Mix. (NH_4NO_3 + $(NH_4)_2SO_4$)			
120.2	83.00	2.23	14.77
119.2	82.28	3.08	14.64
120.0	81.97	3.44	14.59
123.0	81.39	4.24	14.46
A/C = 80.95/19.05			
A			
121.5	80.95	0	19.05
120.1	80.72	0.29	18.99
118.6	80.49	0.57	18.94
117.5	80.02	1.15	18.83
C			
119.0	79.55	1.73	18.72
123.9	78.89	2.55	18.56
127.1	78.31	3.27	18.42
131.3	77.34	4.47	18.19
A/C = 80.42/19.58			
C			
125.0	80.42	0	19.58
126.0	80.10	0.40	19.50
128.0	79.62	0.99	19.39
129.9	78.96	1.81	19.23
133.0	78.04	2.95	19.01

A = NH_4NO_3; B = KCl; C = KNO_3 (200) (A.)

t_L, °C	M % A	M % B	M % C
A/C = 96.81/3.19			
A			
166.0	96.81	0	3.19
159.4	94.76	2.12	3.12
152.7	92.16	4.80	3.04
Mix. (A + C)			
143.9	89.11	7.96	2.93
142.9*	86.10	11.06	2.84
142.9	84.56	12.65	2.79
NH_4Cl			
143.0†	84.10	13.13	2.77
149.7‡	83.54	13.71	2.75
154.4§	83.02	14.25	2.73
160.8‖	82.50	14.78	2.72
A/C = 93.56/6.44			
A			
162.8	93.56	0	6.44
158.3	92.09	1.58	6.33
149.1	88.91	4.98	6.11
148.6¶	87.70	6.27	6.03
148.1**	86.50	7.55	5.95
Mix. (A + C)			
147.7	85.35	8.78	5.87
147.6††	84.65	9.53	5.82
148.0	82.43	11.90	5.67
NH_4Cl			
149.4‡‡	81.54	12.85	5.61
151.6§§	81.15	13.26	5.59
158.7‖‖	80.36	14.11	5.53
166.0	79.54	14.99	5.47
A/C = 88.92/11.08			
A + Mix. (A + C)			
157.5E	88.92	0	11.08

t_L, °C	M % A	M % B	M % C
	A/C = 88.92/11.08		
	Mix. (A + C)		
156.3	86.54	2.68	10.78
155.6	84.28	5.22	10.50
157.0	84.00	5.55	10.45
158.0	82.10	7.67	10.23
162.9	80.17	9.85	9.98

* This mixture gives ternary E [Mix. (A + C) + A + NH_4Cl] at 134.5°C.
† This mixture gives E_1 [Mix. (A + C) + NH_4Cl] at 142.9°C.
‡ At 143.9°C.
§ At 144.7°C.
‖ At 146.1°C.
¶ This mixture gives E_1[A + Mix. (A + C)] at 145.4°C.
** At 140.3°C.
†† This mixture gives ternary E[A + NH_4Cl + Mix. (A + C)] at 134.5°C.
‡‡ This mixture gives E_2[NH_4Cl + Mix. (A + C)] at 147.4°C.
§§ At 148.0°C.
‖‖ At 150.5°C.

A = NH_4NO_3; B = K_2SO_4; C = KNO_3 (199) (A.)

	A/C = 88.93/11.07		
	A + Mix. (A + C)		
157.2E	88.93	0	11.07
	Mix. (K_2SO_4 + $(NH_4)_2SO_4$)		
158.3	88.76	0.19	11.05
160.8	88.08	0.95	10.97
163.2	87.44	1.67	10.89
164.0	87.16	1.98	10.86
164.5	86.71	2.50	10.79

A = NH_4Cl; B = NaCl; C = $NaNO_3$ (196) (A.)

	C/A = 82.04/17.96		
	NH_4NO_3 + NH_4Cl		
141.0E	17.96	0	82.04
	A		
141.0*	17.93	0.17	81.90
145.5†	17.74	1.19	81.07
155.0‡	17.43	3.00	79.57
164.5	17.14	4.58	78.28
	C/A = 85.70/14.30		
	NH_4NO_3		
148.0	14.30	0	85.70
143.5	14.14	1.15	84.71
140.5	14.02	1.95	84.03
	NH_4NO_3 + NH_4Cl		
137.0E	(?)	(?)	(?)
	A		
140.0§	13.71	4.20	82.09
142.5‖	13.60	4.86	81.54
153.0	13.28	7.16	79.56
166.5	12.95	9.45	77.60

* This mixture gives E(NH_4NO_3 + NH_4Cl) at 140.5°C.
† At 138.5°C.
‡ At 134.5°C.
§ This mixture gives E(NH_4NO_3 + NH_4Cl) at 133.0°C.
‖ At 132.5°C.

A = $PbCl_2$; B = $PbBr_2$; C = PbI_2 (155); Fig. 46

A = $PbCl_2$; B = NaCl; C = KCl (255); Fig. 47

A = $Pb(NO_3)_2$; B = $NaNO_3$; C = KNO_3 (99) (A.)

t, °C	M % A	M % B
	A + B + C	
186E	18.04	30.18

A = $CdCl_2$; B = NaCl; C = KCl (42); Fig. 48

A = $CdBr_2$; B = NaBr; C = KBr (44); Fig. 49

A = AgCl; B = AgBr; C = AgI (155); Fig. 50

A = AlF_3; B = CaF_2; C = NaF (75); Fig. 51

A = MgO; B = NaF; C = KF (28) (A.)

t_L, °C	M % A	M % B
	B/C = 39.98/60.02	
	(?)	
702*	0	39.98
709	1.26	39.47
701	3.73	37.56
695.5	6.04	36.68
677	11.40	35.42
951	16.14	33.52

* E for B + C.

A = MgF_2; B = CaF_2; C = BaF_2 (28) (A.)

	A/B = 55.63/44.37	
	(?)	
954*	55.63	44.37
926	53.29	42.50
935	50.62	40.38
935	47.56	37.94
905	44.02	35.16
886	39.86	31.80
835	34.91	27.84
790	28.93	23.07
935	21.54	17.19
1120	12.20	9.73
(1288)	0	0

All these mixtures give a halting pt. at 790–810°.

* E for A + B.

A = $MgCl_2$; B = $BaCl_2$; C = KCl (154) (A.)

t_L, °C	M % A	M % B
	B/C = 33.33/66.67	
	BC_2	
660	0	33.33
645	11	26
	BC_2 + AC*	
445E	45	3
	AC	
465	48	1
486	50	0
	A/C = 50/50	
	AC	
486	50	0
460	48	2.5
	AC + BC_2	
440E_1	46	7
	BC_2	
445	43.5	12

* BC_2 + AC = pseudobinary system. All mixtures give the E at 445°.

t_L, °C	M % A	M % B
	A/C = 50/50	
	BC_2 + B	
440E_2		
	B	
460	40.5	17.5
650	34	28
720	32	35
810	26.5	46.5
870	15	69.5
922	0	100

AC + B = pseudobinary system
0–12% $BaCl_2$ give E_1 at 440°
12–100% $BaCl_2$ give E_2 at 440°
All mixtures give a ternary E (AC + BC_2 + B) at 435°

	C/B = 66.7/33.3	
	BC_2	
660	0	33.3
650	11.5	29.5
630	22.5	26
540	28.5	24
	34	22
	BC_2 + B	
445E_1		
	B	
470	39	20.5
470	45	18.5
475	51.5	16.5
	B + A	
450E_2	56.5	14.5
	A	
490	63	12.5
540	68	11
620	79	7
770	100	0

BC_2 + A = pseudobinary system. Mixtures of 0–51.5% A give E_1 at 445° and a ternary E(AC + BC_2 + B) at 432°. Mixtures of 51.5–100% A give E_2 at 450° and a ternary E (AC + B + A) at 440°.

A = $MgCl_2$; B = NaCl; C = KCl (243); Fig. 52

A = CaO; B = CaF_2; C = $CaCl_2$ (18) (A.)

t_L, °C	M % A	M % B
	A	
ca. 800	13.26	12.30

A = CaO; B = BaO; C = $BaCl_2$ (222) (A.)

	A	
921	3.22	0
931	2.22	0.22
940	0.91	2.02
938	0.57	6.03

A = $CaCl_2$; B = $SrCl_2$; C = $BaCl_2$ (239); Fig. 54

A = $CaCl_2$; B = NaCl; C = KCl (145, 243); Fig. 55

A = $Ca(NO_3)_2$; B = $NaNO_3$; C = KNO_3 (160); Fig. 53

A = $CaCO_3$; B = Na_2CO_3; C = K_2CO_3 (173); Fig. 56

A = $SrCl_2$; B = $BaCl_2$; C = NaCl (263); Fig. 57

A = $SrCl_2$; B = $BaCl_2$; C = KCl (263); Fig. 58

A = $SrCl_2$; B = NaCl; C = KCl (243); Fig. 59

A = $Sr(NO_3)_2$; B = $NaNO_3$; C = KNO_3 (107) (A.)

t_L, °C	M % A	M % B
	(?)	
254.2	8.12	43.25
221.8	5.25	52.64
210.0	5.26	43.13
209.5	5.26	42.11
210.5	5.26	41.04
226.8	5.26	31.58
209.0	4.71	43.97
208.4	4.71	42.94
209.2	4.71	41.89
210.0	4.16	43.76
211.2	4.16	42.71
213.8	2.57	46.15

A = $BaCl_2$; B = NaCl; C = KCl (87, 263); Fig. 60

A = $Ba(NO_3)_2$; B = $LiNO_3$; C = KNO_3 (91) (A.)

t_L, °C	M % A	M % B
	(?)	
299.1	5.26	84.22
310.4	5.26	73.70
317.4	5.26	63.17
303.7	5.26	52.65

A = $Ba(NO_3)_2$; B = $NaNO_3$; C = KNO_3 (107); Fig. 61

A = LiCl; B = NaCl; C = KCl (215, 239); Fig. 62

A = LiCl; B = NaCl; C = RbCl (215) (A.)

t_L, °C	M % A	M % B
	(?)	
320*	58.3	0
318	56.6	2.4
328	54.1	6.7
460	45.5	21.3
545	37.6	34.9

* E for A + C.

A = LiCl; B = NaCl; C = CsCl (215) (A.)

t_L, °C	M % A	M % B
	(?)	
325*	59.0	0
323	58.3	1.1
320	58.0	1.7
326	55.0	6.8
354	53.6	9.0
431	49.4	16.3
493	44.7	24.1

* E for A + C.

A = $LiNO_3$; B = $NaNO_3$; C = KNO_3 (60); Fig. 63

$A = NaOH; B = Na_2CO_3; C = KOH$ (171) (A.)

t_L, °C	M % A	M % B
A/C = 50/50 (?)		
167	50.00	0
183	48.93	2.14
199	47.35	5.30
214	45.53	8.94
219.5	44.63	10.74

$A = NaOH; B = Na_2CO_3; C = K_2CO_3$ (171) (A.)

B/C = 55.25/44.75 (?)		
290.0	100	0
275.5	96.90	1.91
265.0	91.90	5.00
266.0	89.64	6.39
267.5	87.63	7.62

$A = NaF; B = NaCl; C = Na_2SO_4$ (273); Fig. 64

$A_1 = SnO_2; A_2 = PbO; A_3 = ZnS; A_4 = CuO; A_5 = ZnO$

B = Sea salt (98.14 Wt. % NaCl; 0.23% $MgCl_2$; 0.24% $MgSO_4$; 0.19% K_2SO_4; 0.71% $CaSO_4$; 0.24% H_2O; 0.24% insol.) (114) (A.)

t, °C	Wt. % A_1*
890	0.006
880	0.014
1150	0.016
t, °C	**Wt. % A_2***
900	0.153
870	0.194
920	0.272
1220	0.431
t, °C	**Wt. % A_3***
870	0.099
865	0.121
900	0.135
900	0.152
920	0.318
1220	0.540
1190	0.702
t, °C	**Wt. % A_4***
900	0.281
910	0.361
920	0.790
t, °C	**Wt. % A_5***
890	0.32
870	0.221
1250	0.52

* Dissolved in B.

LITERATURE

(For a key to the periodicals see end of volume)

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(110) Herrmann, *93*, **71**: 257; 11. (111) Hevesy, *7*, **73**: 667; 10. (112) Hissink, *7*, **32**: 357; 00. (113) Holmes, *45*, **12**: 781; 20. (114) Houben, *192*, **9**: 592; 12. (115) Hüber, *93*, **116**: 139; 21. (116) Iitsuka, *429*, **4**: 61; 20. (117) Isbekow, *93*, **84**: 24; 13. (118) Isbekow, *93*, **143**: 80; 25. (119) Jaeger, *64V*, **20**: 497; 11.

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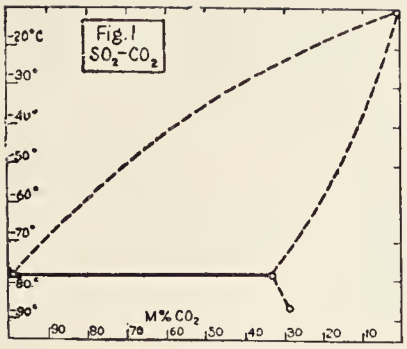


Fig. 1
SO_2–CO_2
M% CO_2

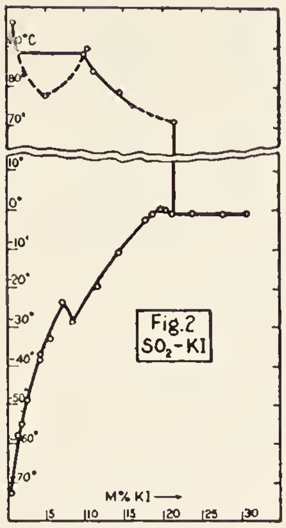
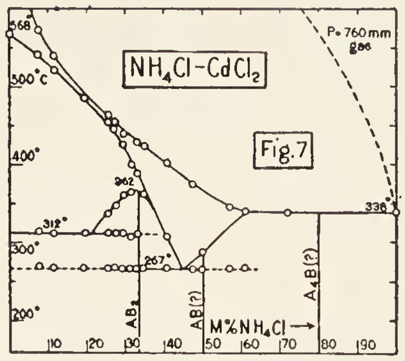
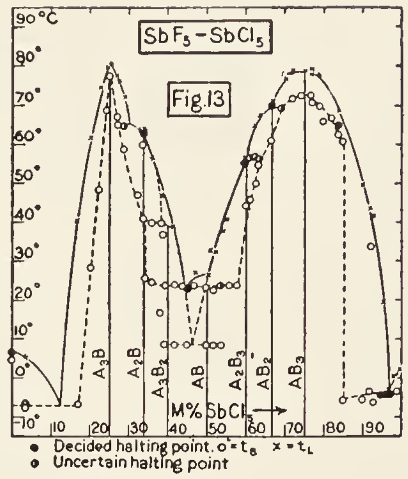


Fig. 2
SO_2–KI
M% KI


NH_4Cl–$CdCl_2$
Fig. 7
P=760 mm
gas
M% NH_4Cl


SbF_5–$SbCl_5$
Fig. 13
M% $SbCl_5$
Decided halting point
Uncertain halting point

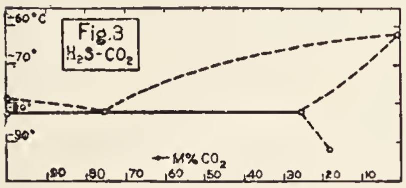
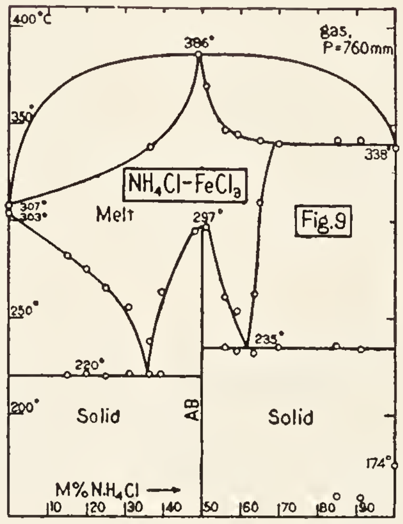
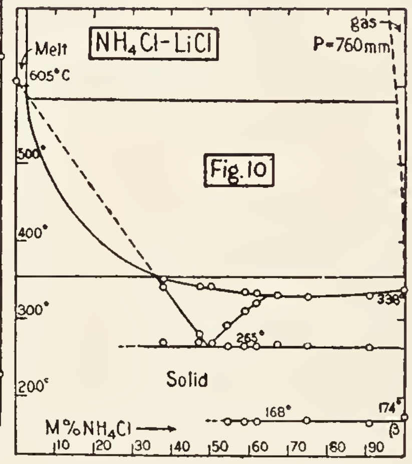


Fig. 3
H_2S–CO_2
M% CO_2


NH_4Cl–$FeCl_3$
Fig. 9
gas,
P=760 mm
Melt
Solid
Solid
M% NH_4Cl


NH_4Cl–LiCl
Fig. 10
gas
P=760 mm
Melt
Solid
M% NH_4Cl

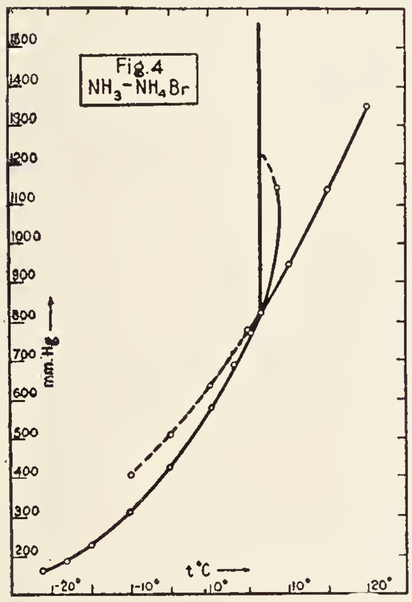
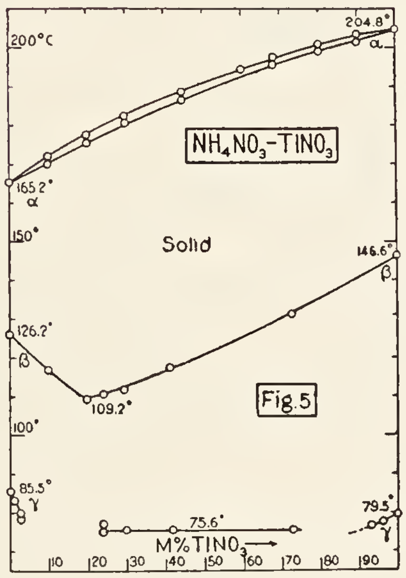
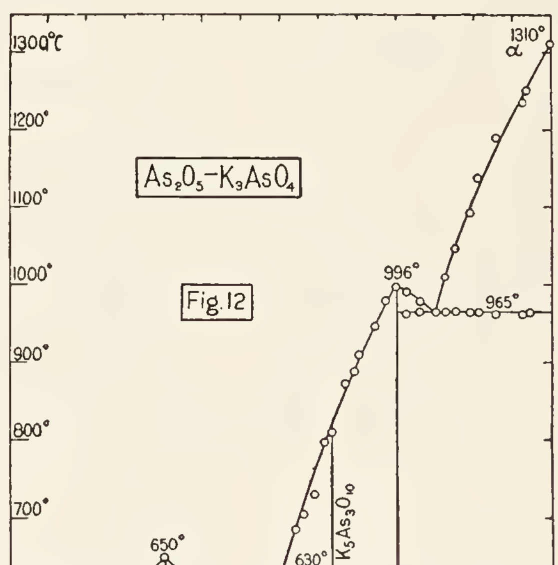
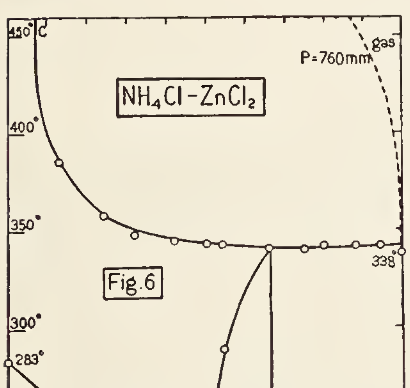
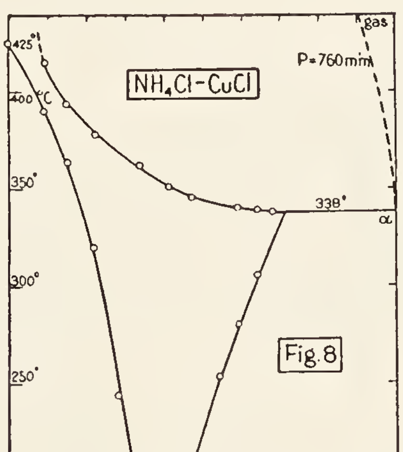


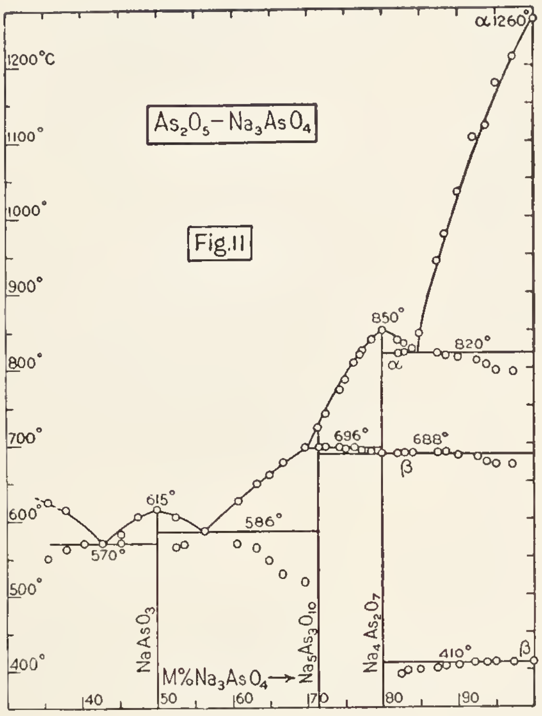
Fig. 4
NH_3–NH_4Br
mm. Hg
t °C

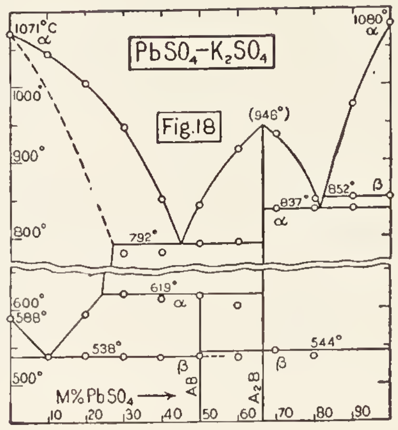

NH_4NO_3–$TlNO_3$
Solid
Fig. 5
M% $TlNO_3$


As_2O_5–K_3AsO_4
Fig. 12
M% K_3AsO_4


NH_4Cl–$ZnCl_2$
P=760 mm
gas
Fig. 6
M% NH_4Cl


NH_4Cl–CuCl
P=760 mm
gas
Fig. 8
Solid
M% NH_4Cl


$As_2O_5-Na_3AsO_4$
Fig. 11
M% Na_3AsO_4 →
$NaAsO_3$
$Na_5As_3O_{10}$
$Na_4As_2O_7$


$PbSO_4-K_2SO_4$
Fig. 18
M% $PbSO_4$ →

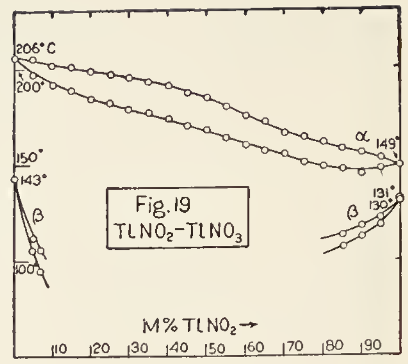
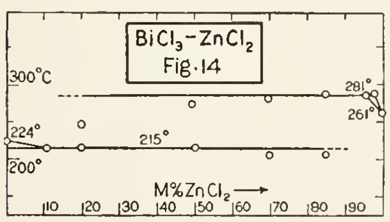
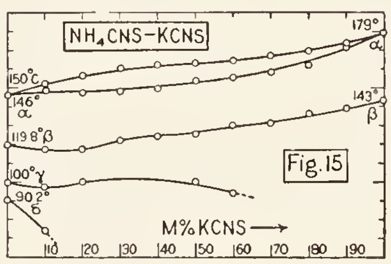
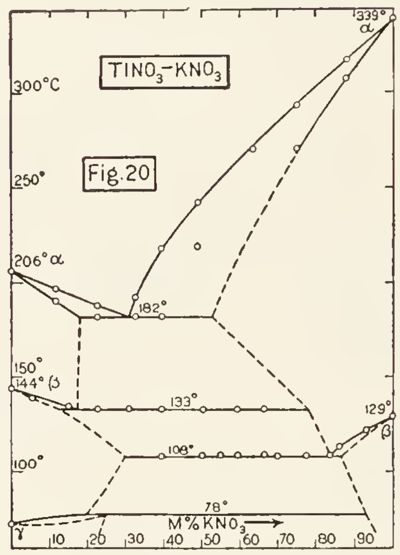
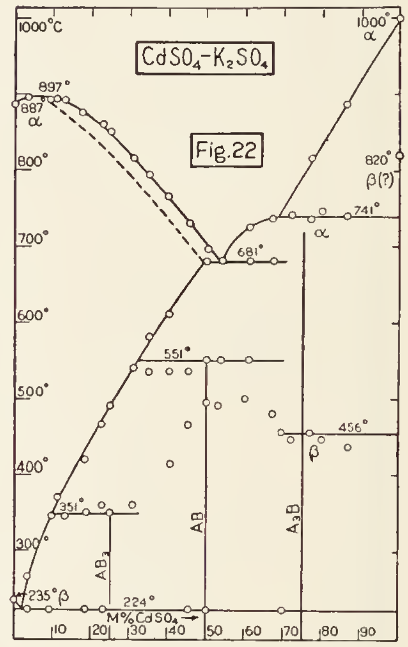


Fig. 19
$TlNO_2-TlNO_3$
M% $TlNO_2$ →


$BiCl_3-ZnCl_2$
Fig. 14
M% $ZnCl_2$ →


$NH_4CNS-KCNS$
Fig. 15
M% KCNS →


$TlNO_3-KNO_3$
Fig. 20
M% KNO_3 →


$CdSO_4-K_2SO_4$
Fig. 22
M% $CdSO_4$ →

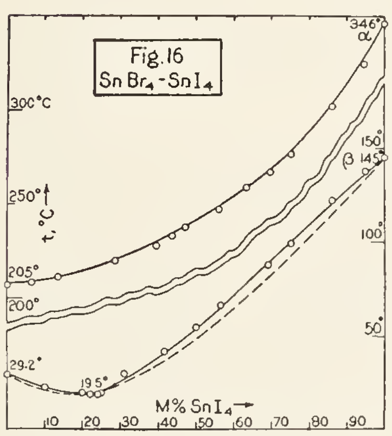
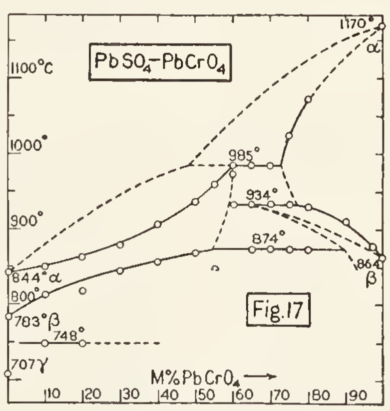
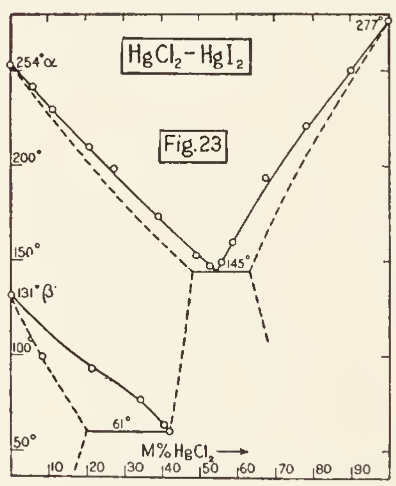
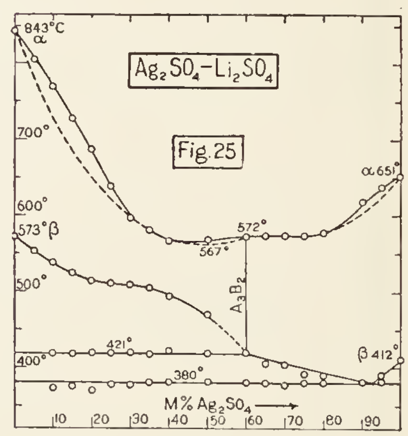
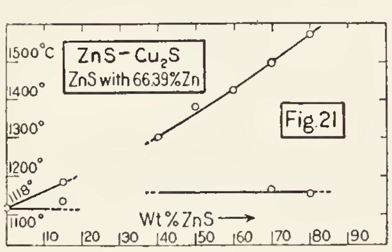


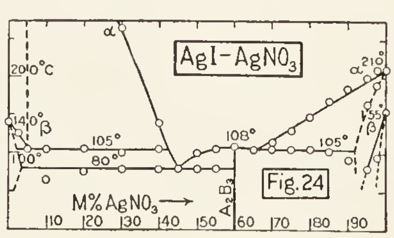
Fig. 16
$SnBr_4-SnI_4$
M% SnI_4 →

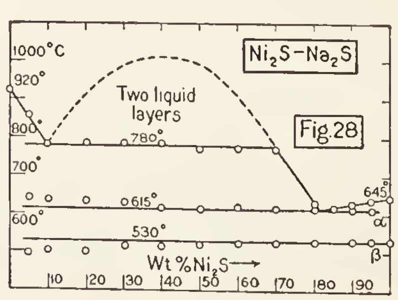

$PbSO_4-PbCrO_4$
Fig. 17
M% $PbCrO_4$ →


$HgCl_2-HgI_2$
Fig. 23
M% $HgCl_2$ →


$Ag_2SO_4-Li_2SO_4$
Fig. 25
M% Ag_2SO_4 →


ZnS−Cu_2S
ZnS with 66.39% Zn
Fig. 21
Wt % ZnS →


AgI−$AgNO_3$
Fig. 24
M% $AgNO_3$ →


Ni_2S-Na_2S
Two liquid layers
Fig. 28
Wt % Ni_2S →

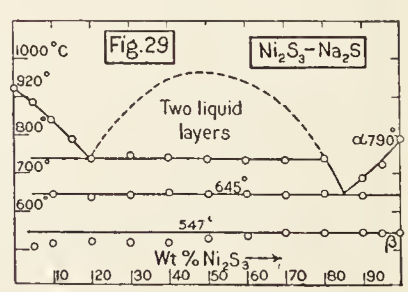
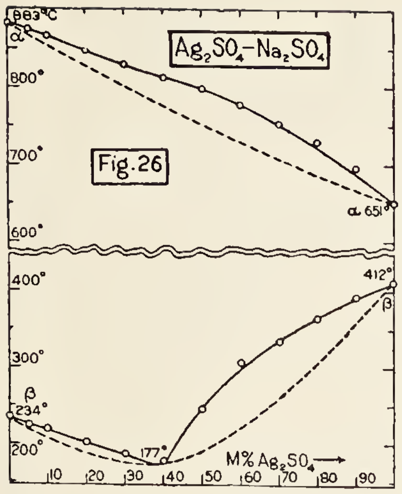
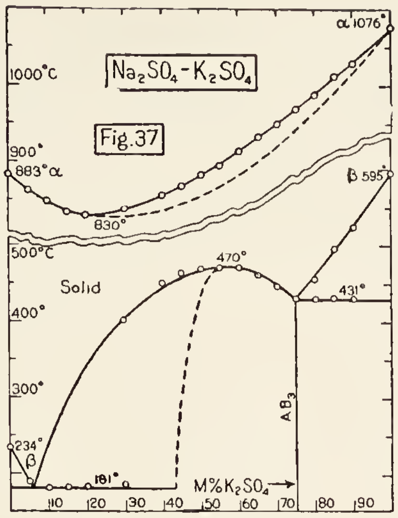
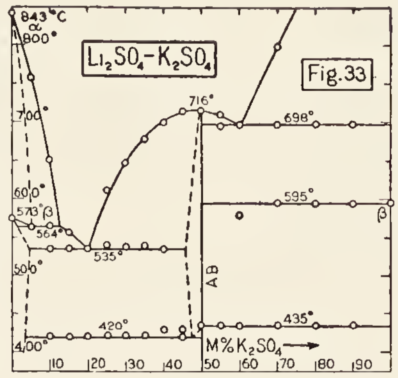
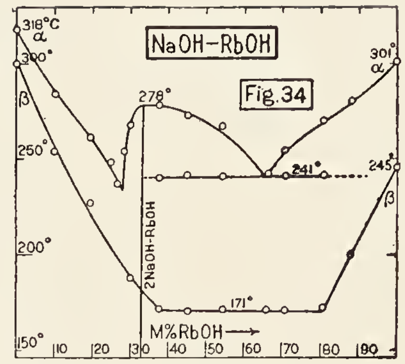


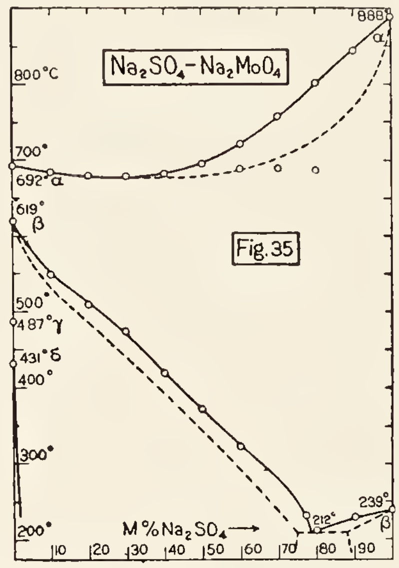
Fig. 29
$Ni_2S_3-Na_2S$
Two liquid layers
Wt % Ni_2S_3 →

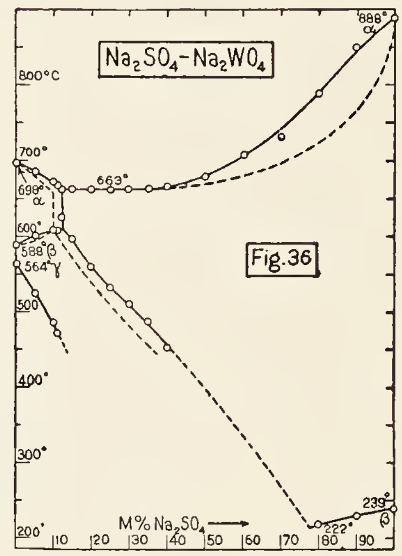

Ag2SO4-Na2SO4
Fig.26
883°C
α
800°
700°
600°
α 651°
400°
412°
β
300°
β
234°
200°
177°
M% Ag2SO4 ⟶
10 20 30 40 50 60 70 80 90


Na2SO4-K2SO4
Fig.37
α 1076°
1000°C
900°
883° α
830°
β 595°
500°C
470°
Solid
431°
400°
300°
234°
β
181°
AB3
M%K2SO4 ⟶
10 20 30 40 50 60 70 80 90


Li2SO4-K2SO4
Fig.33
843°C
α
800°
716°
700°
698°
600°
573°β
595°
564°
535°
β
500°
AB
420°
435°
400°
M%K2SO4 ⟶
10 20 30 40 50 60 70 80 90


NaOH-RbOH
Fig.34
318°C
α
300°
β
278°
301°
α
250°
241°
245°
β
2NaOH-RbOH
200°
171°
150°
M%RbOH ⟶
10 20 30 40 50 60 70 80 90


Na2SO4-Na2MoO4
Fig.35
888°
α
800°C
700°
692° α
619°
β
500°
487° γ
431° δ
400°
300°
200°
212°
239°
β
M % Na2SO4 ⟶
10 20 30 40 50 60 70 80 90


Na2SO4-Na2WO4
Fig.36
888°
α
800°C
700°
698°
α
663°
600°
588°β
564°γ
500
400°
300°
200°
222°
239°
β
M% Na2SO4 ⟶
10 20 30 40 50 60 70 80 90

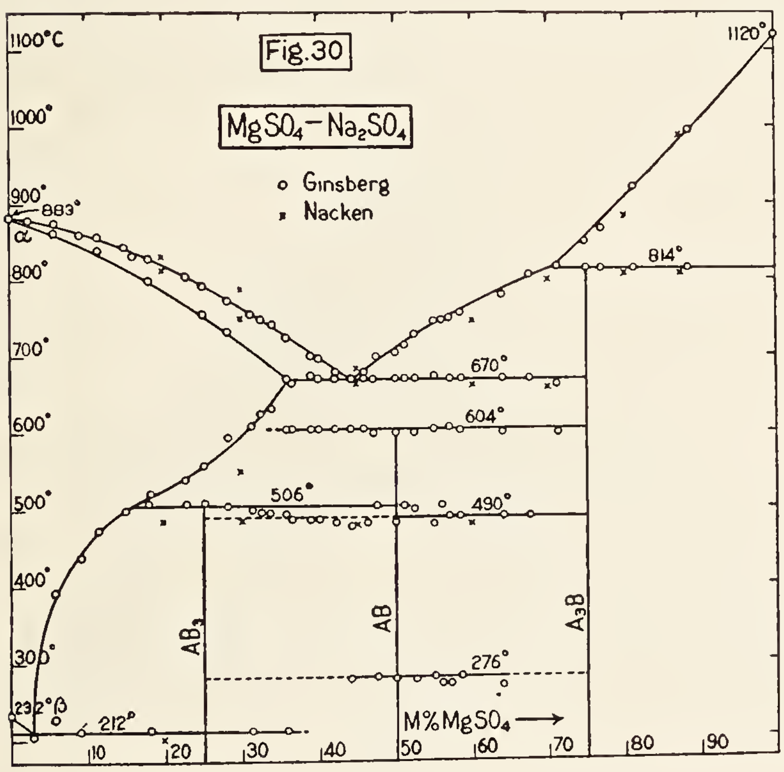
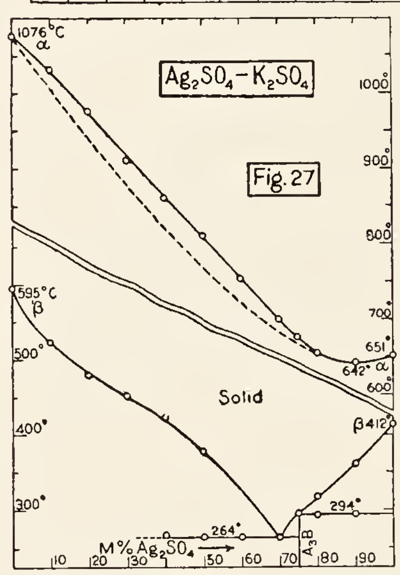
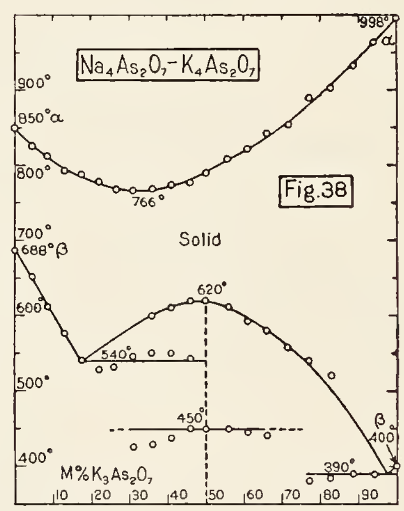
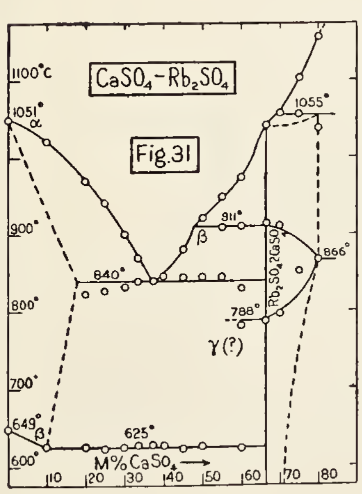
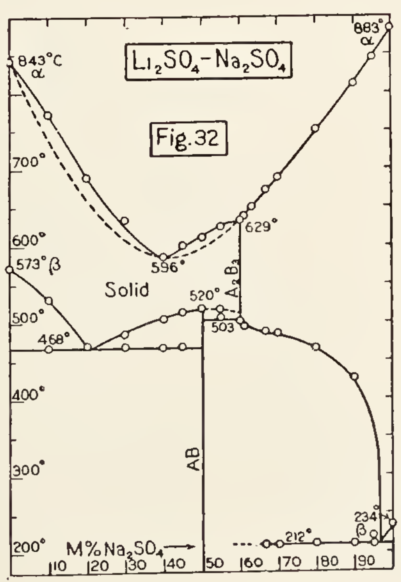


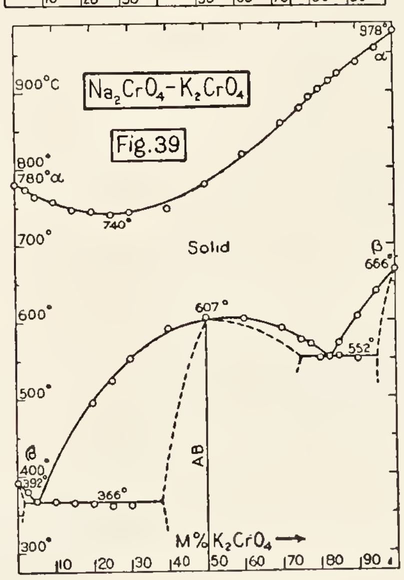
Fig.30
MgSO4-Na2SO4
o Ginsberg
x Nacken
1100°C
1120°
1000°
900°
883°
α
800°
814°
700°
670°
600°
604°
500°
506°
490°
400°
AB3
AB
A3B
300
276°
232°β
212°
M% MgSO4 ⟶
10 20 30 40 50 60 70 80 90

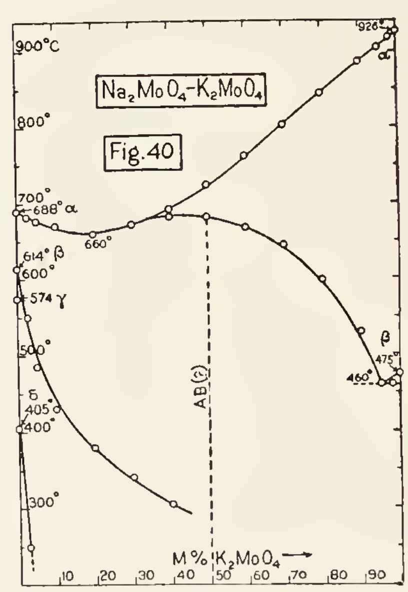

Ag2SO4-K2SO4
Fig.27
1076°C
α
1000
900
800
700
651°
642° α
600
595°C
β
500°
Solid
β412°
400°
300°
294°
264°
A3B
M% Ag2SO4 ⟶
10 20 30 40 50 60 70 80 90

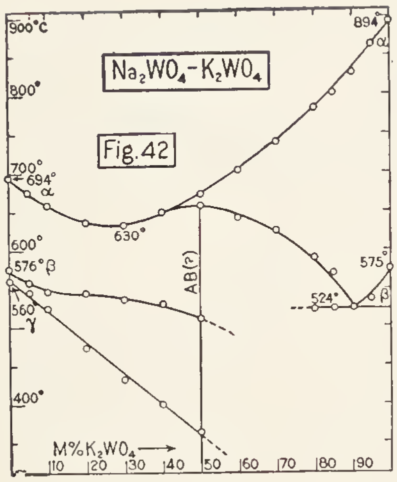

Na4As2O7-K4As2O7
Fig.38
998°
α
900°
850° α
800°
766°
Solid
700°
688° β
620°
600°
540°
500°
450°
β
400
400°
390°
M% K4As2O7
10 20 30 40 50 60 70 80 90

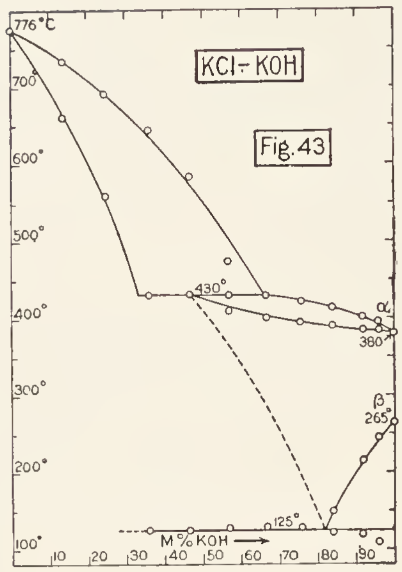

CaSO4-Rb2SO4
Fig.31
1100°C
1051°
α
1055°
900°
β
811°
Rb2SO4·2CaSO4
866°
840°
800°
788°
γ(?)
700°
649°
β
625°
600°
M% CaSO4 ⟶
10 20 30 40 50 60 70 80

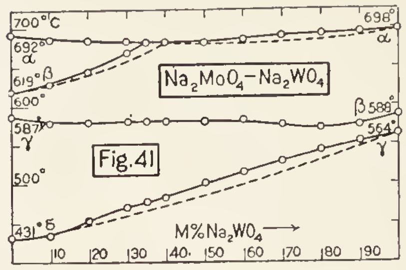

Li2SO4-Na2SO4
Fig.32
883°
α
843°C
α
700°
600°
573° β
596°
629°
Solid
520°
A2B3
503°
500°
468°
400°
AB
300°
234°
β
212°
200°
M% Na2SO4 ⟶
10 20 30 40 50 60 70 80 90

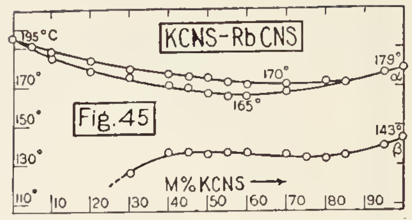

Na2CrO4-K2CrO4
Fig.39
978°
α
900°C
800°
780° α
740°
700°
Solid
β
666°
607°
600°
552°
500°
AB
β
400
392°
366°
300°
M% K2CrO4 ⟶
10 20 30 40 50 60 70 80 90

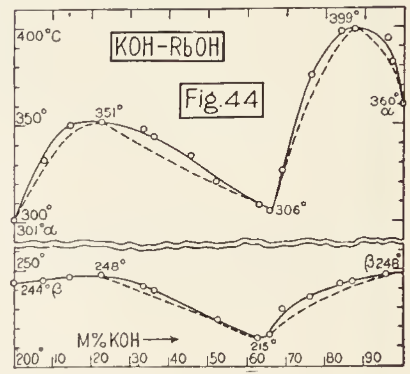

Na2MoO4-K2MoO4
Fig.40
926°
α
900°C
800°
700°
688° α
660°
614° β
600°
574 γ
500°
δ
405°
400°
AB(?)
β
475°
460°
300°
M % K2MoO4 ⟶
10 20 30 40 50 60 70 80 90

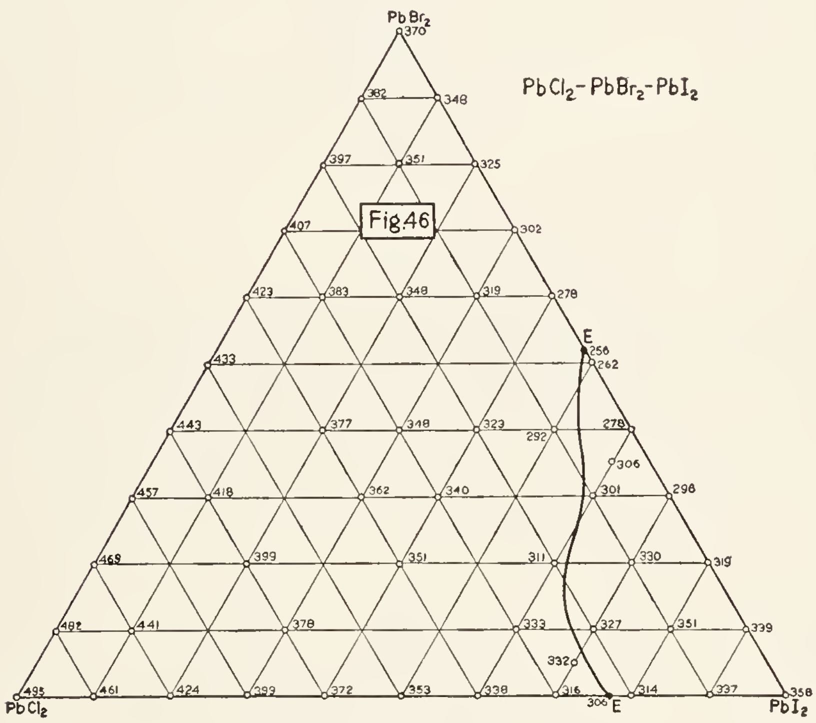

Na_2WO_4-K_2WO_4
Fig.42
M% K_2WO_4 →
AB(?)

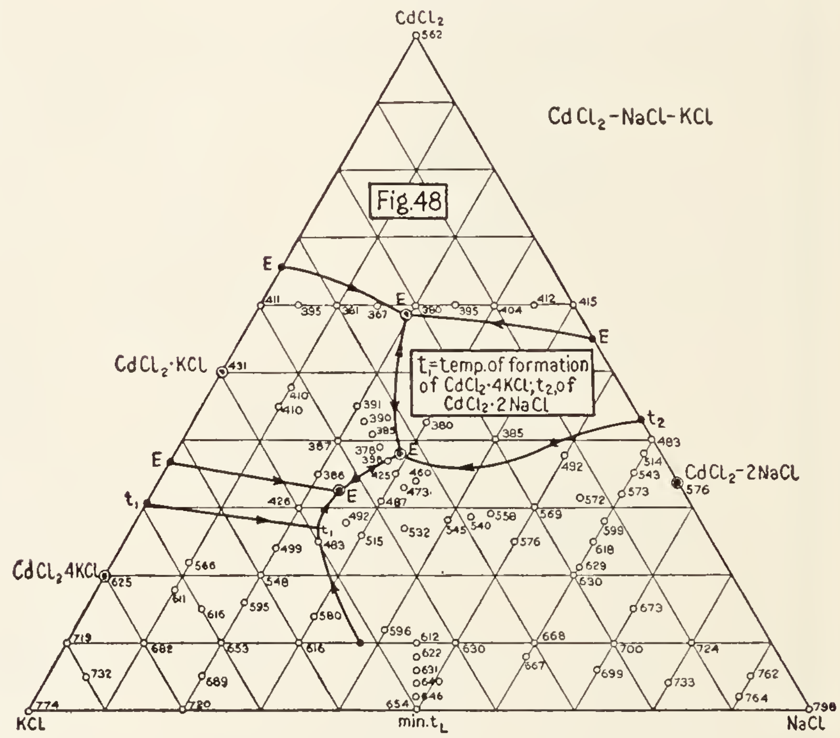

KCl-KOH
Fig.43
M% KOH →

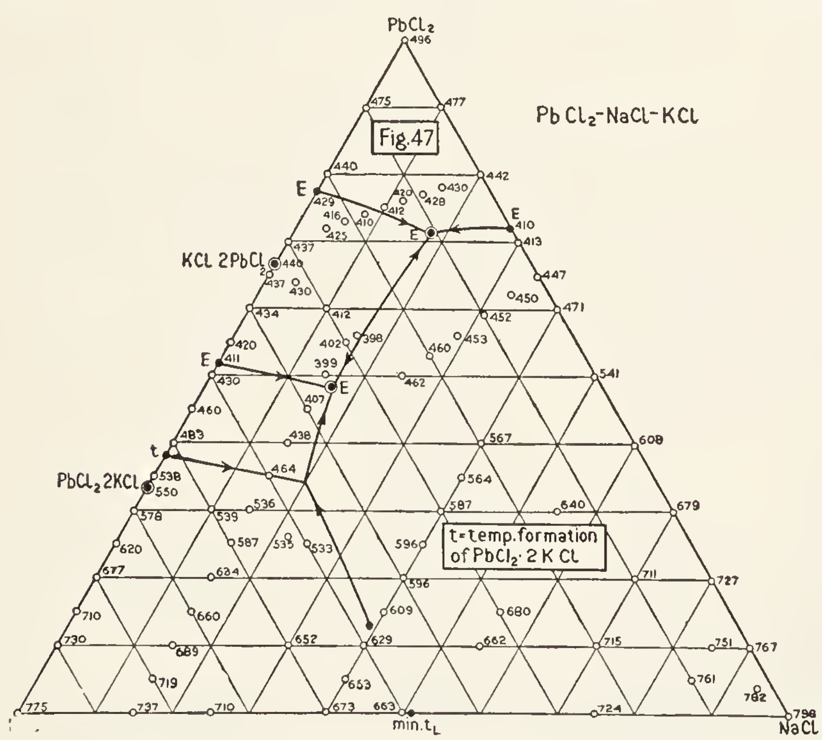

Na_2MoO_4-Na_2WO_4
Fig.41
M% Na_2WO_4 →

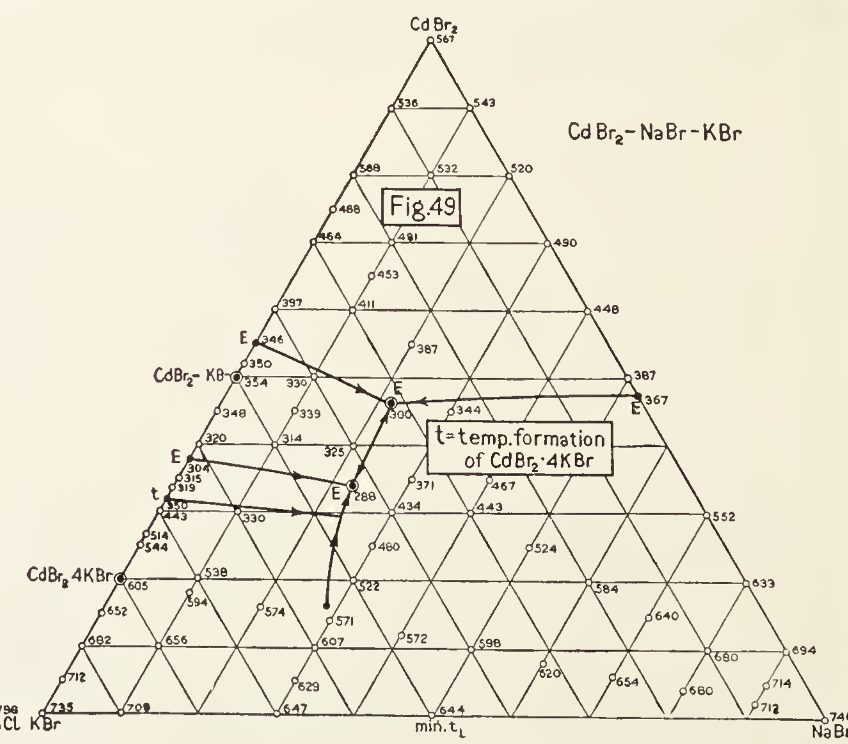

KCNS-RbCNS
Fig.45
M% KCNS →

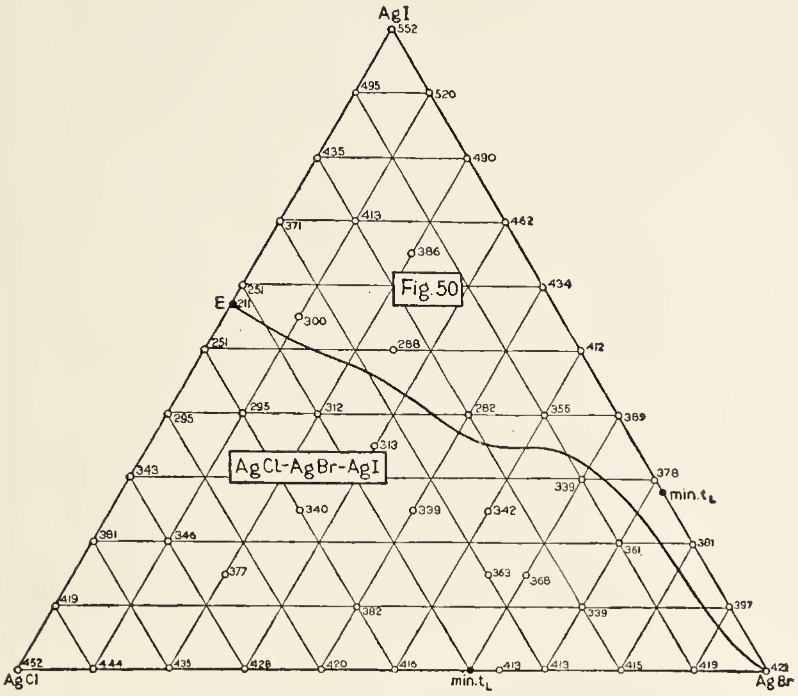

KOH-RbOH
Fig.44
M% KOH →

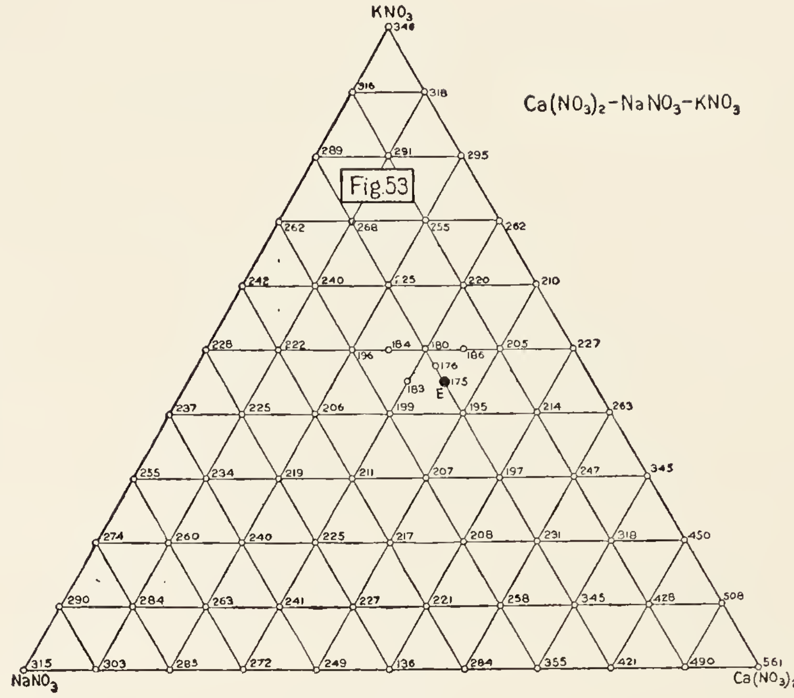

$PbCl_2$-$PbBr_2$-PbI_2
Fig.46
$PbBr_2$
$PbCl_2$
PbI_2

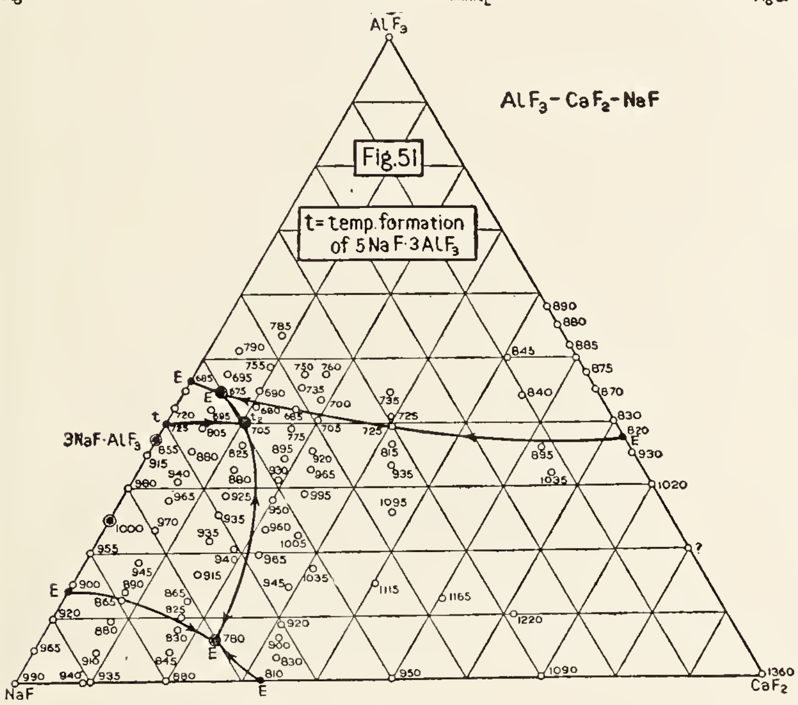

$CdCl_2$-NaCl-KCl
Fig.48
$CdCl_2$
t_1=temp. of formation of $CdCl_2 \cdot 4KCl$; t_2, of $CdCl_2 \cdot 2NaCl$
$CdCl_2 \cdot KCl$
$CdCl_2$-2NaCl
$CdCl_2$4KCl
KCl
NaCl
min. t_L

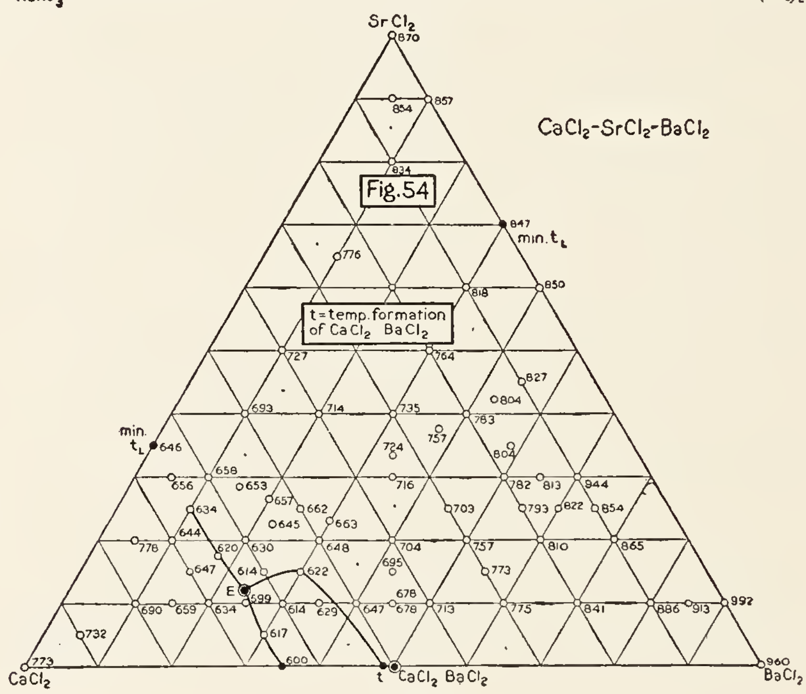

$PbCl_2$-NaCl-KCl
Fig.47
$PbCl_2$
KCl 2$PbCl_2$
$PbCl_2$2KCl
t=temp. formation of $PbCl_2 \cdot 2KCl$
min. t_L
NaCl

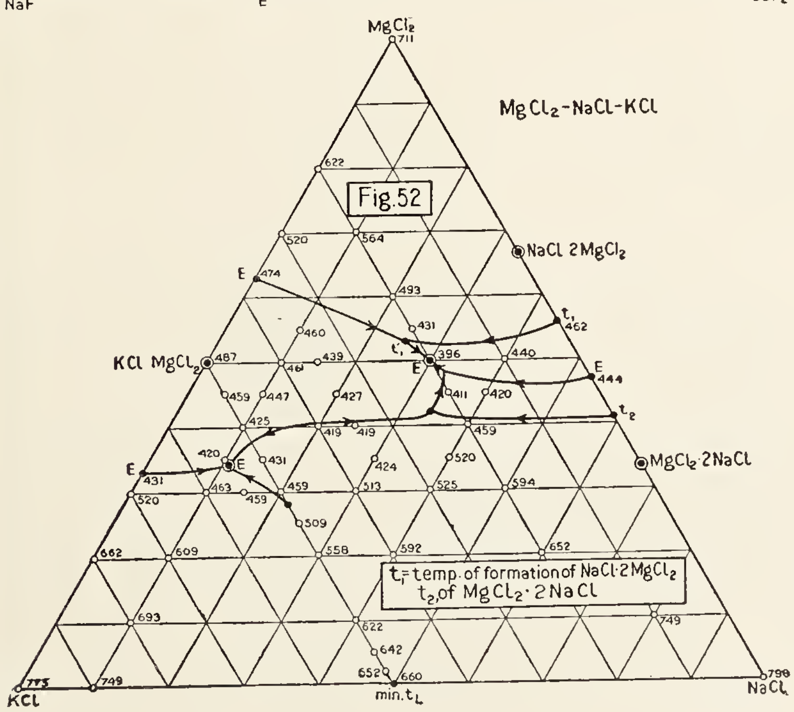

$CdBr_2$-NaBr-KBr
Fig.49
$CdBr_2$
$CdBr_2$-KBr
t=temp. formation of $CdBr_2 \cdot 4KBr$
$CdBr_2$4KBr
KBr
NaBr
min. t_L

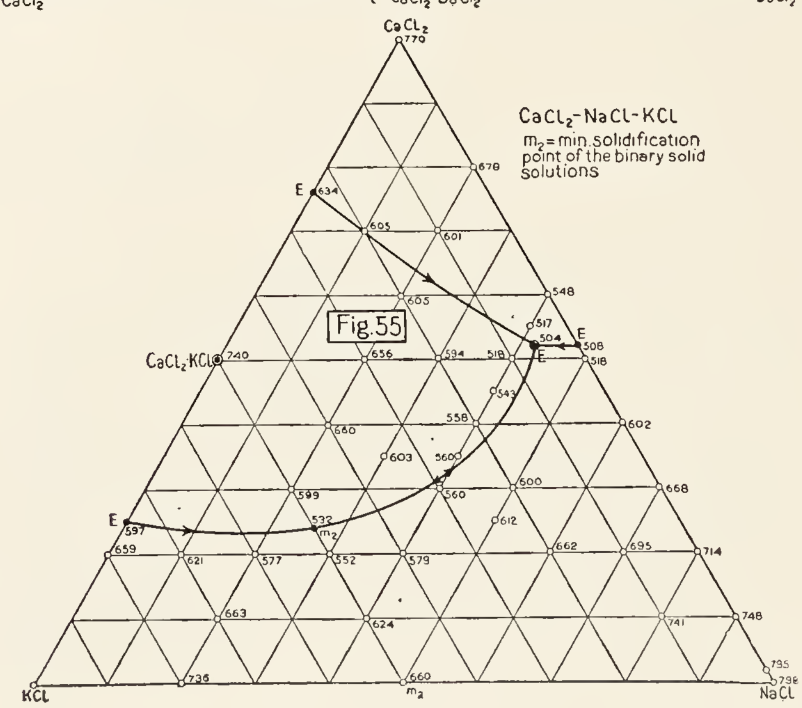

AgI
Fig.50
AgCl-AgBr-AgI
E
min.t_L
AgCl
AgBr

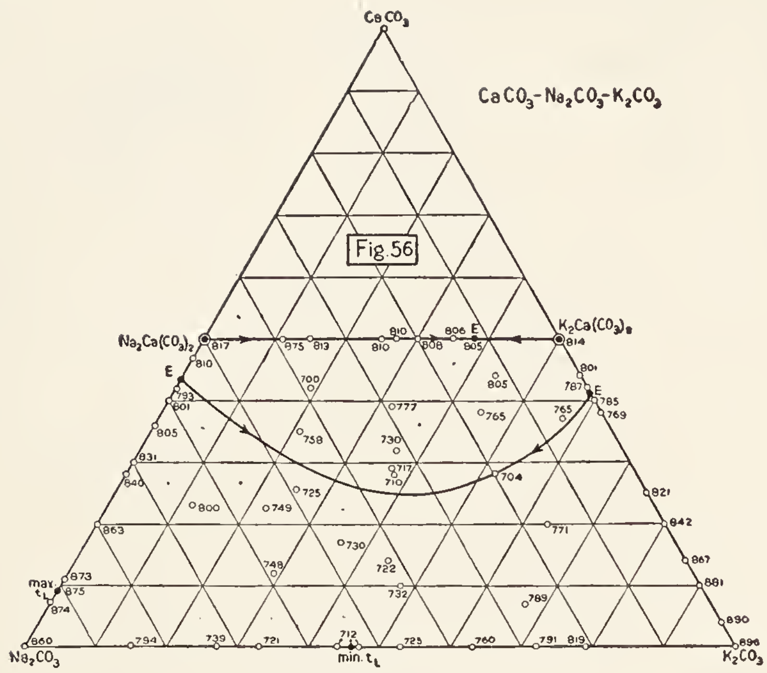

KNO_3
$Ca(NO_3)_2-NaNO_3-KNO_3$
Fig.53
E
$NaNO_3$
$Ca(NO_3)_2$

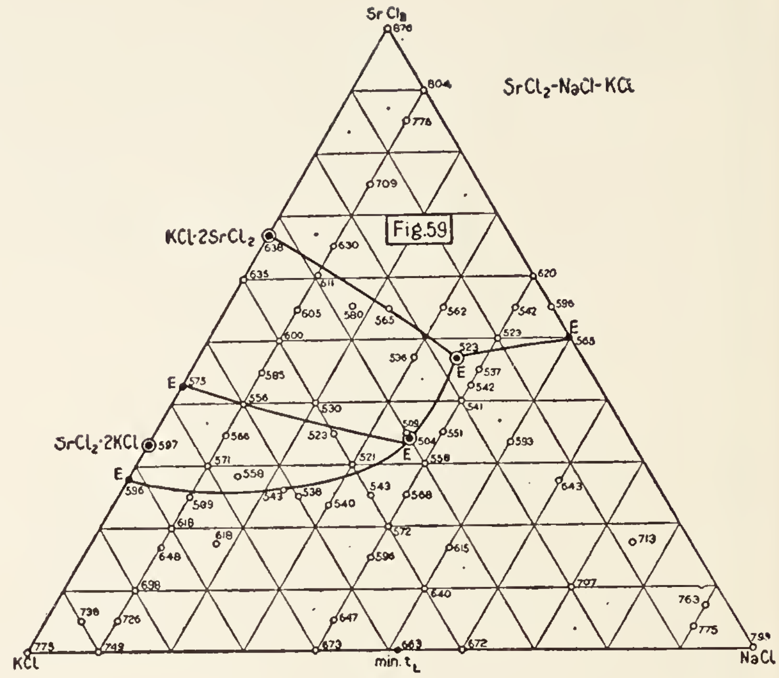

AlF_3
AlF_3-CaF_2-NaF
Fig.51
t=temp.formation of $5NaF\cdot 3AlF_3$
$3NaF\cdot AlF_3$
NaF
CaF_2

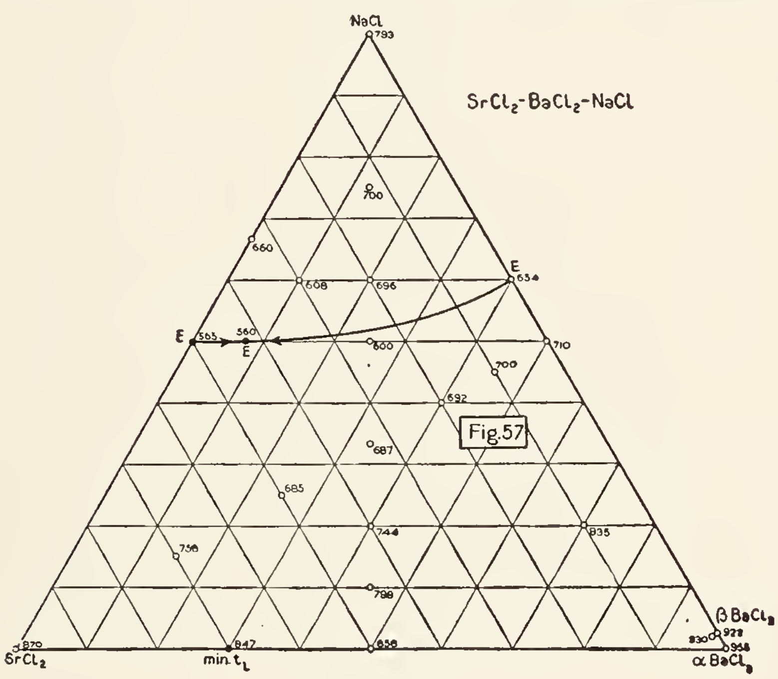

$SrCl_2$
$CaCl_2-SrCl_2-BaCl_2$
Fig.54
min.t_L
t=temp.formation of $CaCl_2\ BaCl_2$
min. t_L
$CaCl_2$
t $CaCl_2\ BaCl_2$
$BaCl_2$

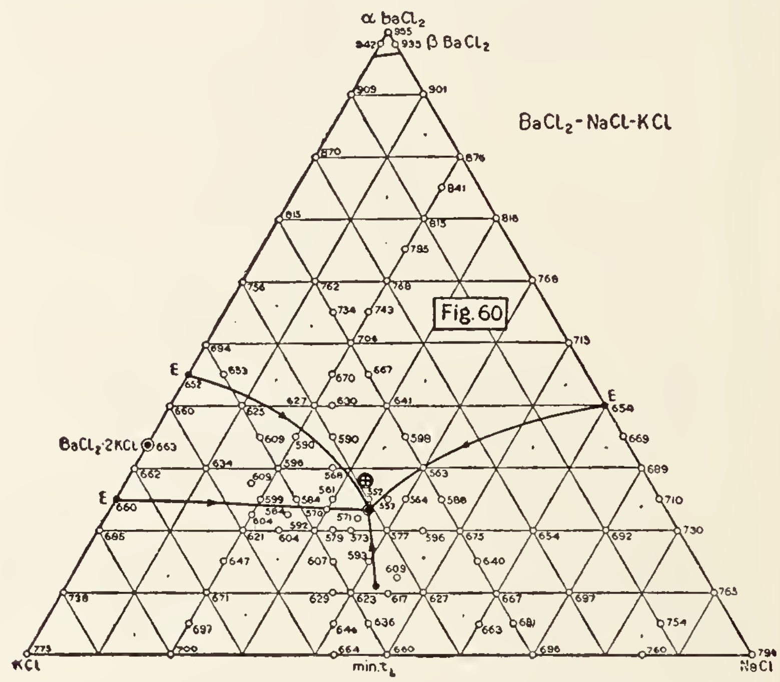

$MgCl_2$
$MgCl_2-NaCl-KCl$
Fig.52
$NaCl\ 2MgCl_2$
$KCl\ MgCl_2$
$MgCl_2\cdot 2NaCl$
t_1=temp. of formation of $NaCl\cdot 2MgCl_2$
t_2, of $MgCl_2\cdot 2NaCl$
KCl
min.t_L
NaCl

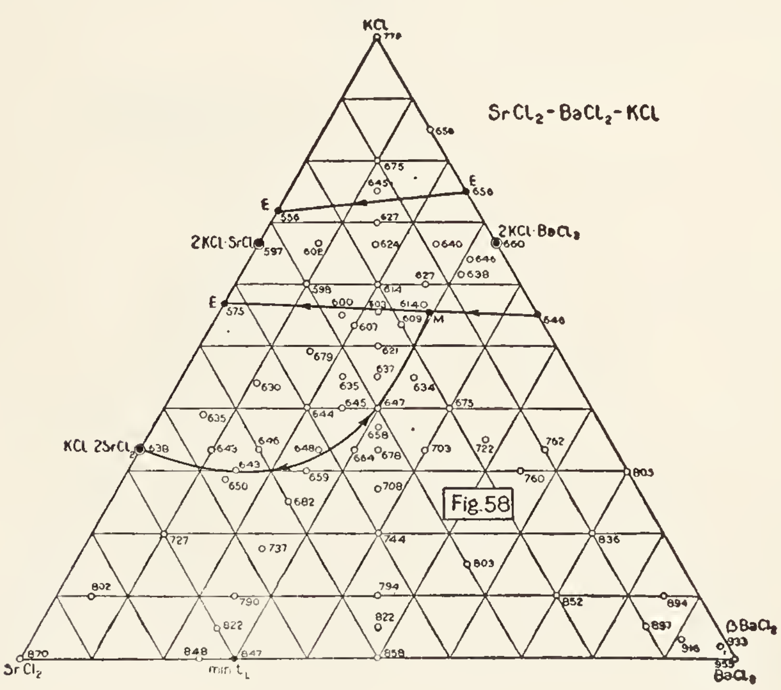

$CaCl_2$
$CaCl_2-NaCl-KCl$
m_2=min.solidification point of the binary solid solutions
Fig.55
$CaCl_2\cdot KCl$
KCl
m_2
NaCl

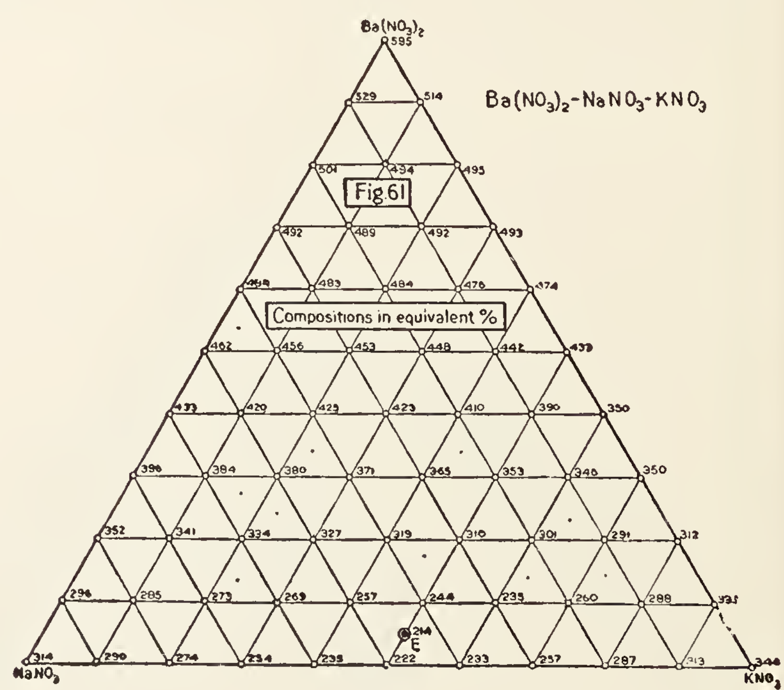

CaCO3
CaCO3-Na2CO3-K2CO3
Fig. 56
Na2Ca(CO3)2
K2Ca(CO3)2
E
max. tL
min. tL
Na2CO3
K2CO3

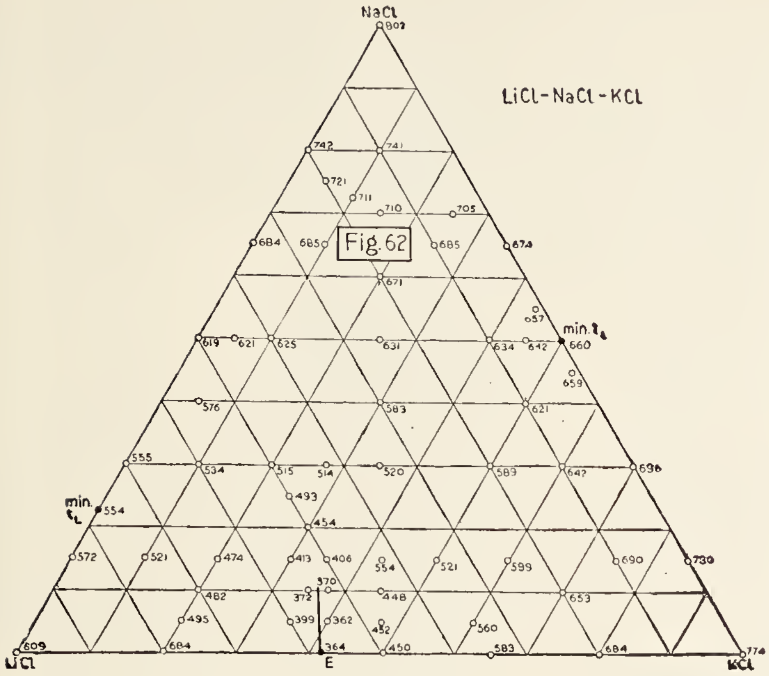

SrCl2
SrCl2-NaCl-KCl
Fig. 59
KCl·2SrCl2
SrCl2·2KCl
E
min. tL
KCl
NaCl

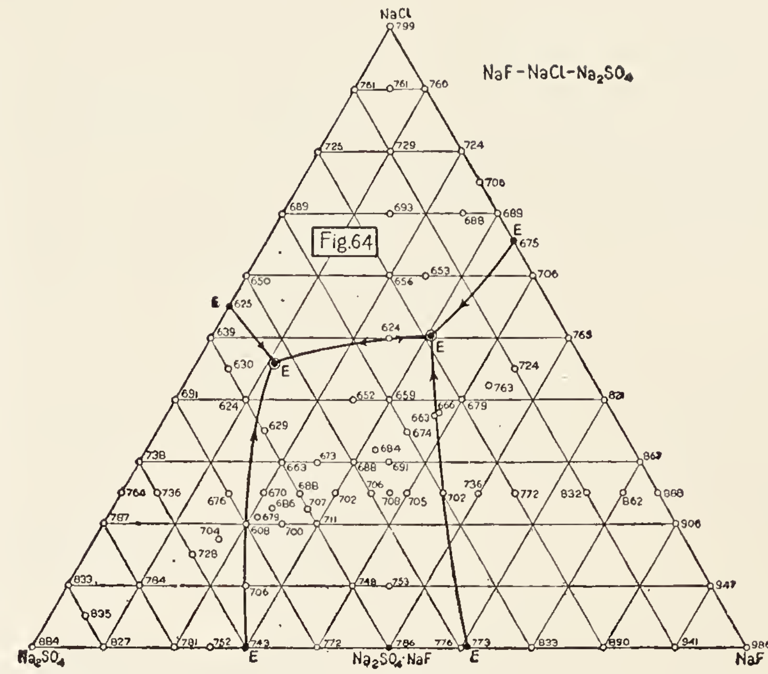

NaCl
SrCl2-BaCl2-NaCl
Fig. 57
E
β BaCl2
α BaCl2
SrCl2
min. tL

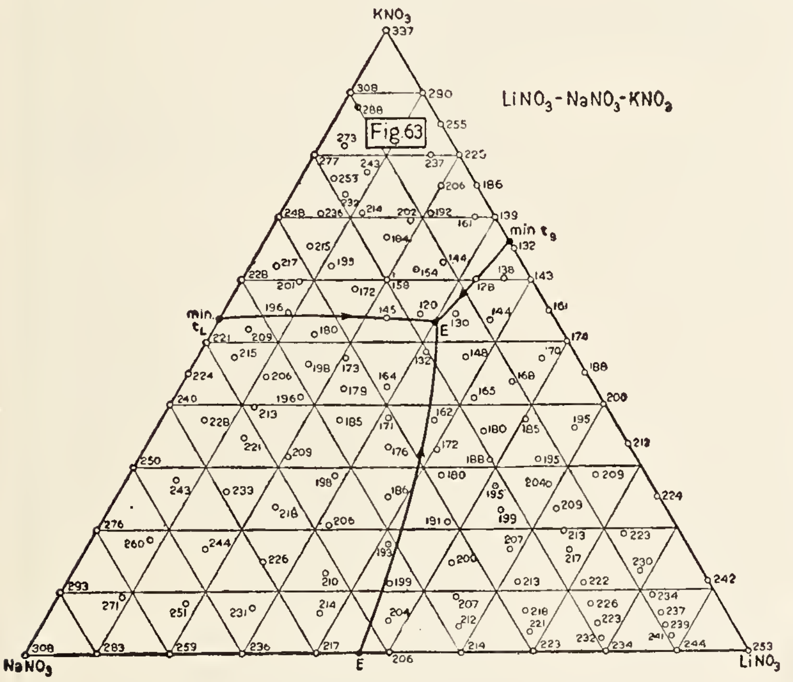

α BaCl2
β BaCl2
BaCl2-NaCl-KCl
Fig. 60
BaCl2·2KCl
E
KCl
min. tL
NaCl


KCl
SrCl2-BaCl2-KCl
2KCl·SrCl2
2KCl·BaCl2
KCl·2SrCl2
E
M
Fig. 58
β BaCl2
BaCl2
SrCl2
min. tL


Ba(NO3)2
Ba(NO3)2-NaNO3-KNO3
Fig. 61
Compositions in equivalent %
E
NaNO3
KNO3







(230) Sandonnini and Scarpa, *22*, **22 II**: 163; 13. (231) Sandonnini and Scarpa, *22*, **22 II**: 517; 13. (232) Sanger and Riegel, *93*, **76**: 79; 12. (233) Scarpa, *22*, **21 II**: 719; 12. (234) Scarpa, *22*, **22 II**: 452; 13. (235) Scarpa, *22*, **24 I**: 738; 15. (236) Scarpa, *22*, **24 I**: 955; 15. (237) Scarpa, *22*, **24 II**: 476; 15. (238) Schaefer, *190*, **1914 I**: 15. (239) Schaefer, *Diss.*, Berlin, 1919.

(240) Schenck and Rassbach, *25*, **41**: 2917; 08. (241) Schobert, *Diss.*, Leipzig, 1912. (242) Schoen, *192*, **8**: 737; 10. (243) Scholich, *Diss.*, Berlin, 1919. (244) Skossareswsky and Tchitchinadzé, *42*, **14**: 153; 16. (245) Smolenskii, *93*, **73**: 293; 12. (246) Steger, *7*, **43**: 595; 03. (247) Stock and Rudolph, *25*, **43**: 150; 10. (248) Tacchini, *36*, **54**: 777; 24. (249) Takahashi, *429*, **4**: 47; 19.

(250) Tammann and Krings, *93*, **130**: 229; 23. (251) Thiel and Schulte, *7*, **96**: 312; 20. (252) Thomas, *192*, **7**: 706; 10. (253) Tolloczko, *7*, **30**: 705; 99. (254) Tolloczko, *165*, **1**: 1; 01. (255) Treis, *190B*, **37**: 766; 14. (256) Truthe, *93*, **76**: 129; 12. (257) Tubandt and Eggert, *93*, **110**: 196; 20. (258) Ussow, *93*, **38**: 419; 04. (259) Vasil'ev, *53*, **44**: 1076; 10.

(260) Vogt, *190*, **1914 II**: 14. (261) Voloskov, *169*, **15**: 428; 11. (262) Vortisch, *190B*, **38**: 185; 14. (263) Vortisch, *190B*, **38**: 513; 14. (264) Vrzhesneskii, *93*, **74**: 95; 12. (265) Wagemann, *192*, **9**: 518; 08. (266) Walden, *93*, **29**: 371; 02. (267) Walden, *93*, **68**: 307; 10. (268) Walden and Centnerszwer, *7*, **42**: 432; 03. (269) Welsh and Broderson, *1*, **37**: 816; 15.

(270) Winter, *Diss.*, Leipzig, 1913. (271) Wise, *1*, **45**: 1233; 23. (272) von Wittorff, *93*, **41**: 85; 04. (273) Wolters, *190B*, **30**: 55; 10. (274) Zambonini, *508*, **45/46**: 3; 15. (275) Zambonini, *36*, **50 II**: 128; 20. (276) von Zawidski, *7*, **47**: 721; 04. (277) Zhemchuzhnui, *93*, **57**: 267; 08. (278) Zhemchuzhnui, *93*, **65**: 403; 10. (279) Zhemchuzhnui, *93*, **153**: 47; 26.

(280) Schmidt, *27*, **39**: 1686; 29. (281) Beach and Bond, *453*, **32**: 328; 25.

SYSTEMS CONTAINING REFRACTORY SUBSTANCES

John Bright Ferguson*

Introduction

Scope.—The substances included in this section are boron nitride, the oxides of Al, Fe, Si, Ti, Th, Ce, Zr, the alkaline earths and the rare earths. The systems covered consist of these substances alone, associated with one another, or associated with any metallic oxide, exclusive of tungstates, vanadates, and molybdates.

Introduction

Champ.—Les substances comprises dans cette section sont: le nitrure de bore, les oxydes d'Al, Fe, Si, Ti, Th, Ce, Zr, les terres alcalines et les terres rares. Les systèmes mentionnés consistent en ces substances seules, associées l'une avec l'autre ou associées à un oxyde métallique, à l'exclusion des tungstates, vanadates et molybdates.

Einleitung

Umfang.—Die in diesem Abschnitt enthaltenden Stoffe sind, Bornitrid, die Oxyde des Al, Fe, Si, Ti, Th, Ce, Zr, der alkalischen und seltenen Erden. Die dargestellten Systeme behandeln diese Stoffe allein oder in Verbindung mit einander, oder in Verbindung mit irgend einem Metalloxyd. Ausgenommen sind Wolframate, Vanadate und Molybdate.

Introduzione

Contenuto.—Le sostanze considerate in questa sezione sono: azoturo di boro, gli ossidi di Al, Fe, Si, Ti, Th, Ce, Zr, quelli dei metalli alcalino-terrosi e delle terre rare. I sistemi presi in considerazione con un ossido metallico qualunque. Sono eccettuati i tungstati, i vanadati ed i molibdati.

* Data marked Ed. added by editorial office.

Bibliography.—See [7, 8, 52].
Temperature Scale.—The temperature scale employed is the I. C. T. scale (*see* Vol. I, p. 53) with *slightly different values* for certain fixed points as follows: diopside, 1391°; Pd, 1550°.

Bibliographie.—Voir [7, 8, 52].
Échelle de température.—L'échelle de température employée est l'échelle des T. C. I. (*voir*, Vol. I, p. 53) avec des *valeurs légèrement différentes* pour les points fixes suivants: diopside, 1391°; Pd, 1550°.

Bibliographie.—Siehe [7, 8, 52].
Temperaturskala.—Die zugrunde liegende Skala ist die der I. C. T. (*siehe* Band I, S. 53) mit *etwas geringer Abweichung* für die Fixpunkte: Diopsid, 1391°; Pd, 1550°.

Bibliografica.—Vedi [7, 8, 52].
Scala della temperatura.—La scala adottata è quella delle I. C. T. (*vedi* Vol. I, p. 53), salvo *piccole variazioni* per quanto riguarda i punti fissi: diopside, 1391°; Pd, 1550°.

ONE-COMPONENT SYSTEMS

Standard Arrangement; *v.* Vol. I, p. 96

MELTING POINTS (m), BOILING POINTS, UNDER 1 ATM. (b), TRANSITION TEMPERATURES (tr.), AND DECOMPOSITION TEMPERATURES (d)

18	SiO_2; *v.* p. 19	
19	TiO_2	Several forms [106]; decomposes into $2Ti_2O_3.3TiO_2$ [122]; for M. P. of Ti_2O, *v.* [54]
	$2Ti_2O_3.3TiO_2$	m, 1640 [122]
	ZrO_2	Several forms [106]; m, 2700 [146], 3000 [109], 2550–2600 [120, 122, 142]; yield point of fused material 2950 [23]
	$ZrO_2.SiO_2$	m, 2550 [94, 146]
	PbO	m, 888 ± 10 [30]
	$PbO.SiO_2$	m, 766 ± 10 [29, 30]
	$2PbO.SiO_2$	m, 746 ± 10 [29, 30]
	ThO_2	m, >2790 [120, 142]
3	ZnO	m, 1975 [157] (Ed.)
	$ZnO.SiO_2$	m, 1437 ± 2 [80, 81]
	$2ZnO.SiO_2$	m, 1509 ± 3 [80, 81]
	$CdO.SiO_2$	m, 1242 ± 2 [80, 81]
	$2CdO.SiO_2$	m, 1242 ± 2 [80, 81]
	MnO	m, >1650 *in vacuo* [142]
	$MnO.SiO_2$	m, 1273 ± 5; heat effects at 1208 and 1120°; interpretation not clear [40, 56, 80, 81]
	$2MnO.SiO$	Probably decomposes into MnO + liq., 1323 [40, 80]
3	FeO	Stability range >570; relations uncertain; *see* binary system $FeO-Fe_3O_4$; magnetic form [47]; M. P. of a ferrous oxide, 1419 [58, 118]
	Fe_2O_3	tr., 678, probable tr., 755–85 [110, 137]; magnetic tr., 40 [73]; *cf.* [140]; in air d, 1100; p_{O_2} = *ca.* 1 atm. at 1200 [67, 74, 117, 144]; m, 1548–65d [58, 89, 118]; *see* binary system $Fe_2O_3-Fe_3O_4$
	Fe_3O_4	Magnetic tr., 530 [6, 31, 124, 135, 136, 149, 155]; m, 1538d [58, 118]; p_{O_2}, 1100° <0.005 mm [74]; 1200° <0.04 mm [137]; *see* binary system $Fe_2O_3-Fe_3O_4$
	$2FeO.SiO_2$	[87]
	Cr_2O_3	m, 1990 ± 20 [58, 86, 118]
	Ta_2O_5	Dissociates into lower oxide which melts about 1460–80 [142]
	BN	d, 1222–1240; $p_{N_2} \ngtr 9.4$ mm [130, 131]; probably two forms [53]
	Al_2O_3	Two forms; probably monotropic [111]; m, α, 2050 ± 10 [86, 118, 120, 142]; b, 2210 (Ar) [121]
	(For borates, *v.* [62, 63])	
	$Al_2O_3.SiO_2$	Unstable forms [22, 59]
	$3Al_2O_3.2SiO_2$	Mullite; d (into liq. + αAl_2O_3) 1810 ± 10 [20, 59, 60]; *see* binary system

57	Yt_2O_3	m, 2410 [120]
	La_2O_3	m, >2000 [142]
	Ce_2O_3	m, 1692 [54]
	BeO	m, 2400 ± 50 [119, 122, 142]
	$BeO.SiO_2$	m, >1755 [80, 81]
76	MgO	m, 2800 ± 20 [86, 120]; b, 2800 (neutral atm.) [121]; b, 2029 at 7 mm [118]; one form only [108]
	$MgO.SiO_2$	Clinoenstatite stable high temp. form; d (into $2MgO.SiO_2$ + liq.) 1557 ± 2; 3 unstable forms [1, 3, 19, 37, 38, 150]
	$2MgO.SiO_2$	m, 1890 ± 20 [19]
	$MgO.Al_2O_3$	m, 2135 ± 20 [111, 128]
	$2MgO.2Al_2O_3.5SiO_2$	Two forms, monotropic; d [112]; *see* ternary system
77	CaO	Two forms—tr., *ca.* 420 [135, 138]; m, 2572 ± 10 [86, 125]; b, 2850 [118, 121]
	$CaO.SiO_2$	α (pseudowollastonite); β (wollastonite); $\alpha \rightleftarrows \beta$ 1200 ± 2 [1, 113]; m, 1540 ± 2 [2, 37, 38, 113]
	$2CaO.SiO_2$	Stable system—$\alpha \rightleftarrows \beta$ 1420 ± 2; $\beta \rightleftarrows \gamma$ 675 ± 5; α m, 2130 ± 20; for labile system, *v.* [33, 34, 35, 37, 38, 113]
	$3CaO.SiO_2$	d (into CaO + $\alpha 2CaO.SiO_2$) 1900 ± 20 [113, 129]; *see* binary system
	$3CaO.2SiO_2$	d (into $2CaO.SiO_2$ + liq.) 1475 ± 5 [113]; *see* binary system
	$CaO.Fe_2O_3$	d (into $2CaO.Fe_2O_3$ + liq.) 1216 ± 5 [139]; *see* binary system
	$2CaO.Fe_2O_3$	d (into CaO + liq.) 1436 ± 5 [139]; *see* binary system
	$2CaO.B_2O_3$	m, 1304 ± 5 [63, 115]
	$CaO.Al_2O_3$	m, 1600 ± 5 [38, 113, 128]
	$3CaO.Al_2O_3$	d (into CaO + liq.) 1535 ± 5 [38, 113, 128]; *see* binary system
	$3CaO.5Al_2O_3$	Two forms, monotropic, stable form m, 1720 ± 10 [38, 113, 128]
	$5CaO.3Al_2O_3$	Two forms, monotropic, stable form m 1455 ± 5 [38, 113, 128]
	$CaO.Al_2O_3.2SiO_2$	m, 1550 ± 2 [9, 10, 32, 36, 37, 38, 113]
	$2CaO.Al_2O_3.SiO_2$	m, 1590 ± 2 [48, 113]
	$3CaO.Al_2O_3.SiO_2$	Pure compound not obtained [113]
	$CaO.MgO.SiO_2$	d (into $2CaO.SiO_2$ + solid soln.) 1498 ± 5 [50]; *see* ternary system
	$CaO.MgO.2SiO_2$	m, 1391 ± 2 [1, 12, 36, 37, 38]
	$2CaO.MgO.2SiO_2$	m, 1458 ± 2 [48, 50]
	$5CaO.2MgO.6SiO_2$	Existence probable but not certain; d, 1365 ± 5 [50]; *see* ternary system
78	SrO	m, 2430 ± 10 [125]; <2570 [42, 97]
	$SrO.SiO_2$	m, 1580 ± 4 [42, 80, 145]
	$2SrO.SiO_2$	m, >1634 [42]; probably, >1755 [80]
	$SrO.Al_2O_3.2SiO_2$	m, >1700 [42]
79	BaO	m, 1923 ± 10 [125]
	$BaO.SiO_2$	m, 1604 ± 5 [42, 80, 81]
	$2BaO.SiO_2$	m, >1755 [42, 80]

79	$BaO.2SiO_2$	m, 1420 ± 4 [15, 16, 42]
	$2BaO.3SiO_2$	m, 1450 ± 2 [42]
	$BaO.Al_2O_3.2SiO_2$	m, >1700 [42]
	$BaO.2CaO.3SiO_2$	d (into $CaO.SiO_2$ + liq.) 1320 ± 4 [42]; *see* binary system
81	Li_2O	m, *ca.* 17oo; in O_2 forms Li_2O_2 which attacks platinum; volatile above 1000° [79]
	$Li_2O.SiO_2$	m, 1201 ± 2 [39, 78, 79]
	$Li_2O.2SiO_2$	d (into $Li_2O.SiO_2$ + liq.) 1032 ± 5 [79]; *see* binary system
	$2Li_2O.SiO_2$	m, or (probably tr.) 1256 ± 3 [79, 126]; *see* binary system
	$2Li_2SiO_3.3ZrSiO_3$	[126]
	$Li_2O.Al_2O_3$	m, >1625 [83]
	$Li_2O.Al_2O_3.2SiO_2$	Two forms; stable form probably pseudoeucryptite, m, 1388 ± 5 [5, 57, 82]
	$Li_2O.Al_2O_3.4SiO_2$	Two forms; stable form β spodumene, m, 1400 ± 3 [5, 82, 83, 96]
82	$Na_2O.SiO_2$	m, 1088 ± 2 [78, 101, 145]
	$Na_2O.2SiO_2$	m, 874 ± 2 [101]
	$Na_2O.Al_2O_3$	m, 1650 [94]
	$Na_2O.Al_2O_3.2SiO_2$	Two forms, nephelite ⇄ carnegieite, tr., 1248 ± 5; carnegieite, m, 1526 ± 2 [9, 14]; unstable tr., 654–692 and possibly 226.5 [21]
	$Na_2O.Al_2O_3.6SiO_2$	m, 1100 ± 10 [10]
	$Na_2O.2CaO.3SiO_2$	m, 1284 ± 5 [100]
	$Na_2O.3CaO.6SiO_2$	d, at 1047 into $CaO.SiO_2$ + liq. of composition 14CaO, $19Na_2O$, $67SiO_2$ [100]
	$2Na_2O.CaO.3SiO_2$	d, at 1141 ± 5 into $Na_2O.2CaO.3SiO_2$ + liq. of composition 11.5CaO, $38.5Na_2O$, $50SiO_2$ [100]
83	$K_2O.SiO_2$	m, 976 [102]
	$K_2O.2SiO_2$	m, 1041 [98, 102, 103, 104]
	$K_2O.2TiO_2$	m, 980 [105]
	$K_2O.Al_2O_3.2SiO_2$	Two forms: tr., 1550 ± 10; m, >1755 [14]
	$K_2O.Al_2O_3.6SiO_2$	d (into $K_2O.Al_2O_3.4SiO_2$ + liq.) 1170 $^{+5}_{-30}$ [99]; *see* binary system

TWO-COMPONENT SYSTEMS

Standard Arrangement, *v.* Vol. III, p. viii

Both Components Simple Oxides

B	Fig.	Lit. and remarks
		A = SiO_2
ZrO_2	1	[146]
PbO	2	[29, 30, 70, 71, 116, 148]
ZnO	2½	[157] (Ed.)
Cu_2O		[107]; not a true binary [134]
MnO		[25, 40, 61]
FeO		At 1690°C: L_1, 3.1%, L_2, 40.0%, FeO [61]; for phase relations, *v.* [87]
CoO		Two liquids [61]
NiO		Two liquids in high silica melts [61]
Al_2O_3	3	[20]
MgO	4	[19, 61]
CaO	5	[2, 35, 51, 61, 113, 129]
SrO	6	[42, 61, 80, 92, 133, 141, 145]
BaO	7	[42, 61, 80]
Li_2O	8	[79]
Na_2O	9	[101]
K_2O		[102, 114]

A	B	Fig.	Lit. and remarks
TiO_2	MnO		[25]
PbO	Fe_2O_3		[90]
FeO	Fe_3O_4		Part of system Fe-O. FeO phase stable above 570° ± 10; probably partial solid solution FeO to 24 Wt. % O_2 and Fe_3O_4 to 27 Wt. % O_2 [27, 41, 45, 46, 68, 72, 95, 127, 153, 154]
Fe_2O_3	Fe_3O_4	10	Part of system Fe-O [74, 90, 132, 137]
Fe_2O_3	Al_2O_3		[26]
Fe_2O_3	CaO	11	Not a true binary [26, 69, 139]
CoO	Al_2O_3		[65]
NiO	MgO		[66]
B_2O_3	CaO		[63]
B_2O_3	SrO		[63]
B_2O_3	BaO		[63]
Al_2O_3	MgO	12	[111, 128]
Al_2O_3	CaO	13	[37, 113, 128]
Al_2O_3	Li_2O		[5]
MgO	CaO		Simple eutectic, *ca.* 33 Wt. % MgO and 2300° [111]
CaO	SrO		X-ray pattern by Wyckoff indicates complete isomorphism [42]

One Simple Oxide + A Binary Compound Of Two Oxides

MgO-$5CaO.3Al_2O_3$, simple eutectic system; eutectic (Wt. %) 44.7 CaO, 48.8 Al_2O_3, 6.5 MgO at 1380° ± 5 [111].

SiO_2-$Li_2O.Al_2O_3$ [5].

One Simple Oxide + A Ternary Compound

SiO_2-$CaO.Al_2O_3.2SiO_2$ [4, 113]; *v.* Fig. 14.

SiO_2-$CaO.MgO.2SiO_2$ [12, 50, 61]; *v*, Fig. 15.

SiO_2-$K_2O.Al_2O_3.4SiO_2$ [99], *v.* Fig. 16.

Al_2O_3-$CaO.Al_2O_3.2SiO_2$; αAl_2O_3 melts at 2050° ± 10, $CaO.Al_2O_3.2SiO_2$ at 1550° ± 2; simple eutectic at 1547 $^{+2}_{-5}$ deg. and 19.3 CaO 39.3 Al_2O_3, 41.4 SiO_2, Wt. % [113].

Two Binary Compounds

A	B	Lit.
$ZrO_2.SiO_2$	$2Li_2O.SiO_2$	[126]
$ZnO.SiO_2$	$CdO.SiO_2$	[88]
$ZnO.SiO_2$	$Li_2O.SiO_2$	[88]
$MnO.SiO_2$	$MnO.TiO_2$	[133]
$MnO.SiO_2$	$MgO.SiO_2$	[92]
$2MnO.SiO_2$	$2MgO.SiO_2$	[84]
$MnO.SiO_2$	$CaO.SiO_2$	[56]
$2MnO.SiO_2$	$2CaO.SiO_2$	[84]
$FeO.SiO_2$	$CaO.SiO_2$	[91]
$2CaO.SiO_2$	$5CaO.3Al_2O_3$	[113]; *v.* Fig. 17
$2CaO.SiO_2$	$2Li_2O.SiO_2$	[126]
$CaO.SiO_2$	$SrO.SiO_2$	[42]; *v.* Fig. 18
$CaO.SiO_2$	$BaO.SiO_2$	[42]; *v.* Fig. 19
$BaO.2SiO_2$	$2BaO.3SiO_2$	[42]; *v.* Fig. 20
$Li_2O.SiO_2$	$Li_2O.B_2O_3$	[88]
$Na_2O.SiO_2$	$CaO.SiO_2$	[100]
$Na_2O.SiO_2$	$Na_2O.WO_3$	[88]
$Na_2O.SiO_2$	$Na_2O.B_2O_3$	[88]

One Binary + One Ternary Compound

Binary	Ternary	Lit.
$MgO.SiO_2$..........	$CaO.Al_2O_3.2SiO_2$	[4]; *v.* Fig. 21
$MgO.SiO_2$..........	$CaO.MgO.2SiO_2$	[12]; *v.* Fig. 22
$2MgO.SiO_2$.........	$CaO.Al_2O_3.2SiO_2$	[4]; *v.* Fig. 23
$2MgO.SiO_2$.........	$CaO.MgO.2SiO_2$	[12]; *v.* Fig. 24
$CaO.SiO_2$	$CaO.Al_2O_3.2SiO_2$	[113]; *v.* Fig. 25
$CaO.SiO_2$	$2CaO.Al_2O_3.SiO_2$	[113]; *v.* Fig. 26
$CaO.SiO_2$	$CaO.MgO.2SiO_2$	[50, 51]; *v.* Fig. 27
$CaO.SiO_2$	$2CaO.MgO.2SiO_2$	[50]; *v.* Fig. 28

Continued on p. 92

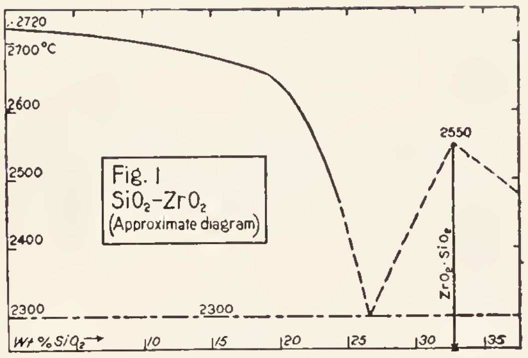


Fig. 1
SiO_2-ZrO_2
(Approximate diagram)
2720
2700°C
2600
2500
2400
2300
2550
2300
$ZrO_2 \cdot SiO_2$
Wt % SiO_2 →
10
15
20
25
30
35

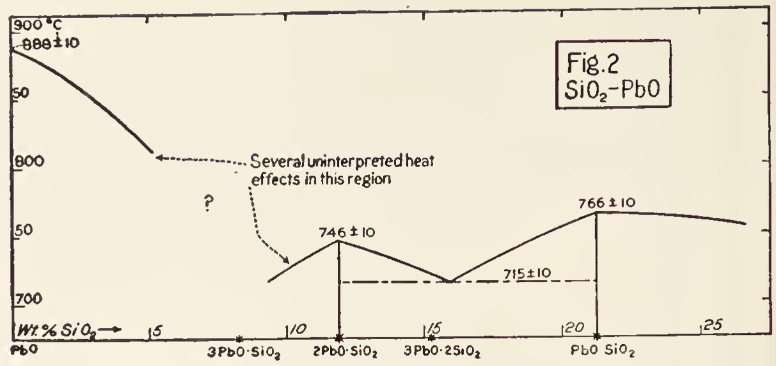


Fig. 2
SiO_2-PbO
900°C
888 ± 10
50
800
50
700
Several uninterpreted heat effects in this region
?
746 ± 10
766 ± 10
715 ± 10
Wt. % SiO_2 →
PbO
5
10
15
20
25
$3PbO \cdot SiO_2$
$2PbO \cdot SiO_2$
$3PbO \cdot 2SiO_2$
$PbO\ SiO_2$

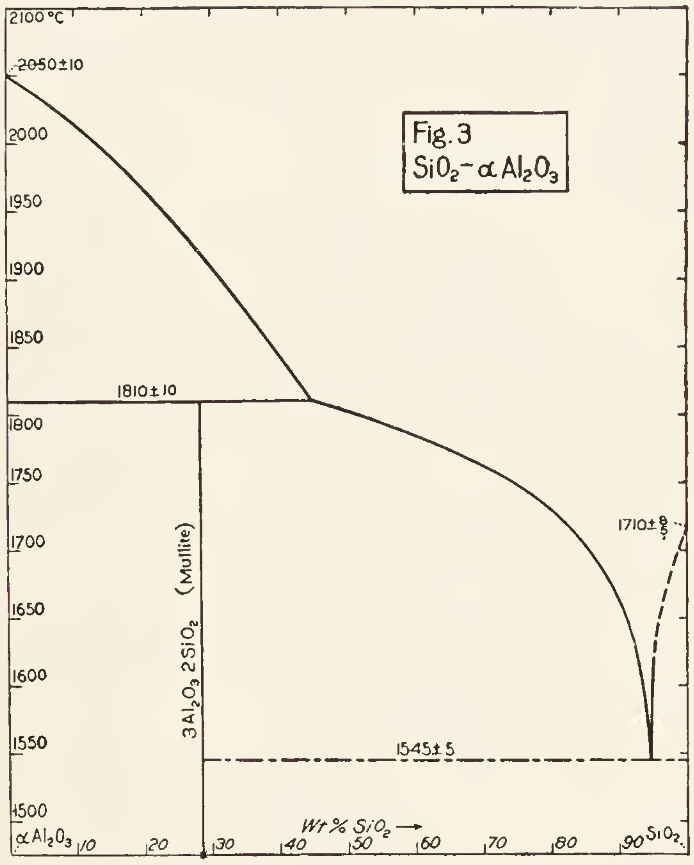


Fig. 3
SiO_2-$\alpha\ Al_2O_3$
2100°C
2050 ± 10
2000
1950
1900
1850
1810 ± 10
1800
1750
1700
1650
1600
1550
1500
1710^{+8}_{-5}
$3Al_2O_3\ 2SiO_2$ (Mullite)
1545 ± 5
Wt % SiO_2 →
$\alpha\ Al_2O_3$
10
20
30
40
50
60
70
80
90
SiO_2

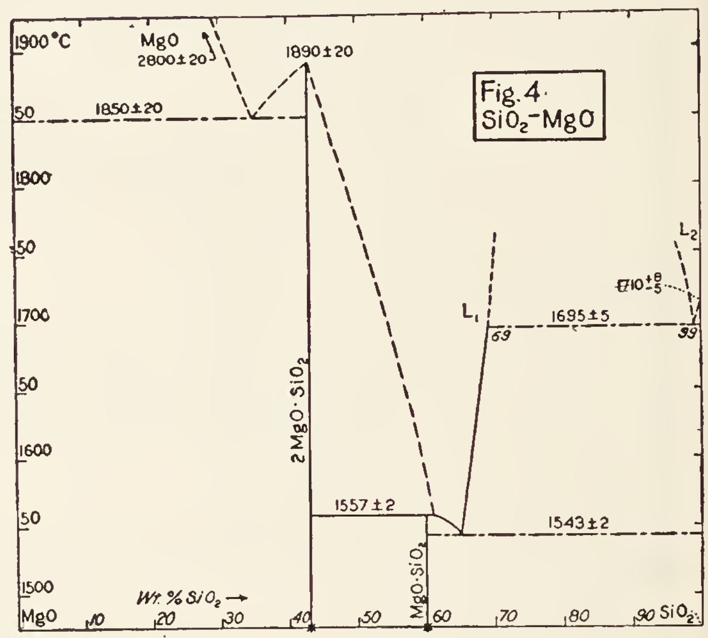


Fig. 4
SiO_2-MgO
1900°C
MgO
2800 ± 20
1890 ± 20
50
1850 ± 20
1800
50
1700
50
1600
50
1500
L_2
1710^{+8}_{-5}
L_1
1695 ± 5
69
99
$2MgO \cdot SiO_2$
1557 ± 2
1543 ± 2
$MgO \cdot SiO_2$
Wt. % SiO_2 →
MgO
10
20
30
40
50
60
70
80
90
SiO_2

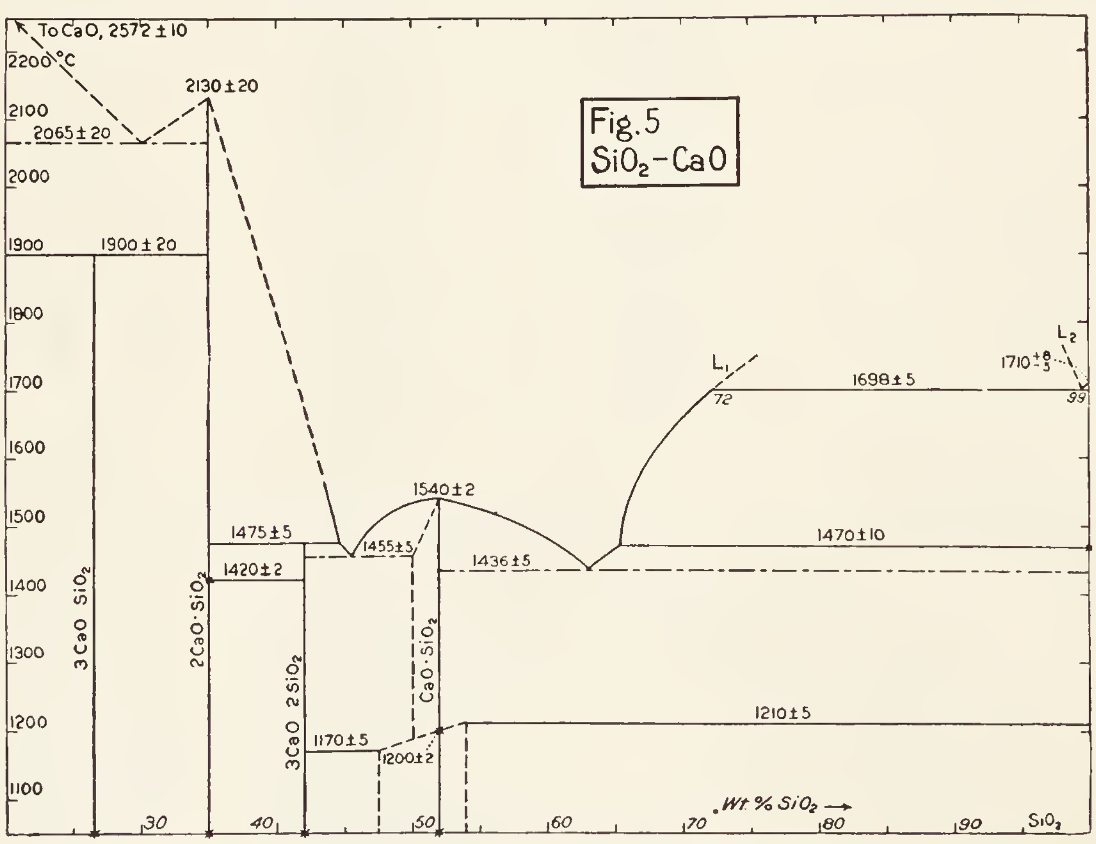


Fig. 5
SiO_2-CaO
To CaO, 2572 ± 10
2200°C
2130 ± 20
2100
2065 ± 20
2000
1900
1900 ± 20
1800
1700
1600
1500
1400
1300
1200
1100
L_2
L_1
1698 ± 5
1710^{+8}_{-3}
72
99
1540 ± 2
1475 ± 5
1455 ± 5
1470 ± 10
1420 ± 2
1436 ± 5
$3CaO\ SiO_2$
$2CaO \cdot SiO_2$
$3CaO\ 2SiO_2$
$CaO \cdot SiO_2$
1210 ± 5
1170 ± 5
1200 ± 2
Wt. % SiO_2 →
30
40
50
60
70
80
90
SiO_2

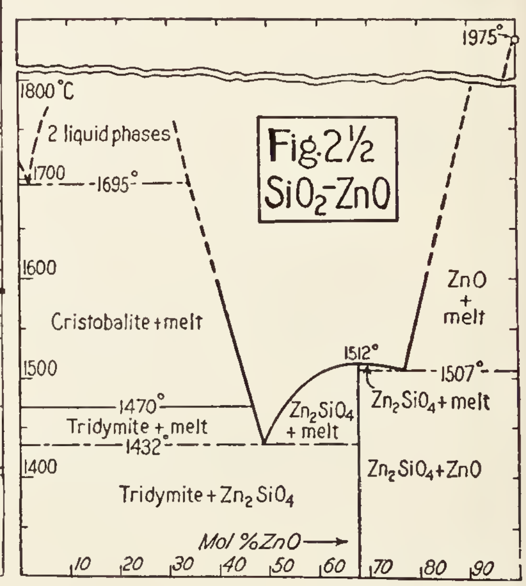


Fig. 2½
SiO_2-ZnO
1975°
1800°C
2 liquid phases
1700
1695°
1600
Cristobalite + melt
ZnO + melt
1512°
1507°
1500
1470°
Tridymite + melt
1432°
Zn_2SiO_4 + melt
Zn_2SiO_4 + melt
1400
Tridymite + Zn_2SiO_4
Zn_2SiO_4 + ZnO
Mol % ZnO →
10
20
30
40
50
60
70
80
90

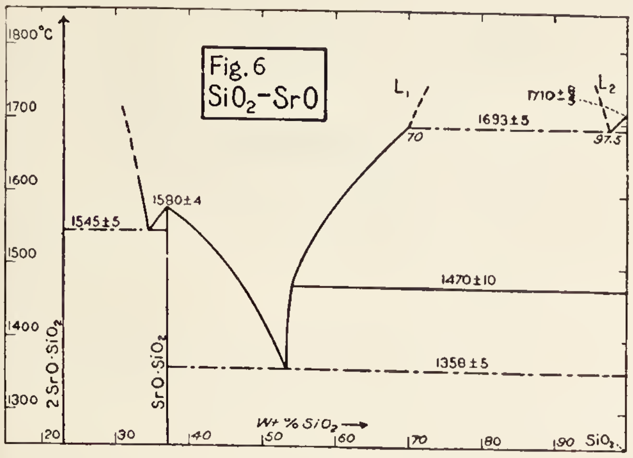


Fig. 6
SiO_2–SrO
1800°C
1700
1600
1500
1400
1300
1545±5
1580±4
1693±5
1470±10
1358±5
L_1
L_2
70
97.5
$2SrO \cdot SiO_2$
$SrO \cdot SiO_2$
Wt % SiO_2 →
20
30
40
50
60
70
80
90
SiO_2

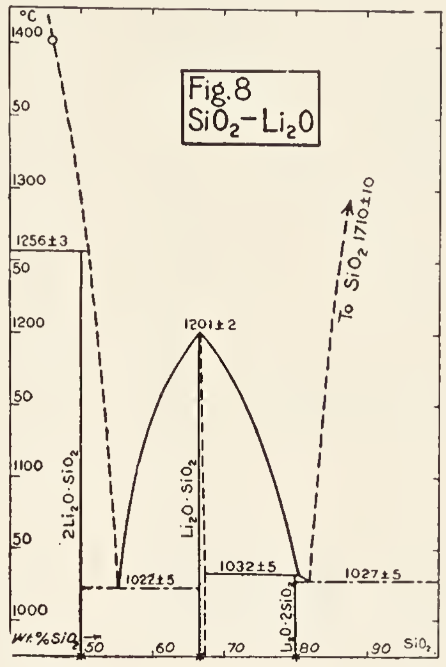


Fig. 8
SiO_2–Li_2O
°C
1400
50
1300
1256±3
1200
1100
1000
1201±2
1022±5
1032±5
1027±5
To SiO_2 1710±10
$2Li_2O \cdot SiO_2$
$Li_2O \cdot SiO_2$
$Li_2O \cdot 2SiO_2$
Wt % SiO_2 →
50
60
70
80
90
SiO_2

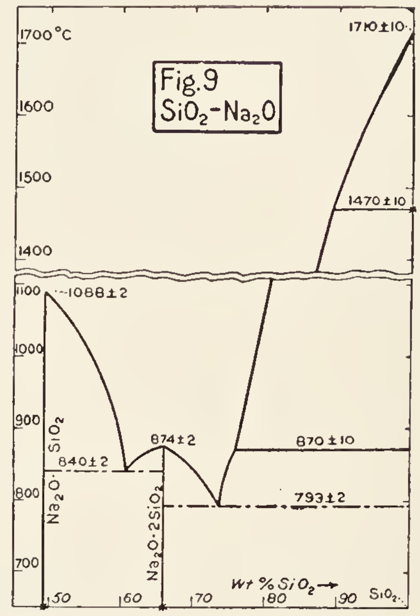


Fig. 9
SiO_2–Na_2O
1700°C
1600
1500
1400
1100
1000
900
800
700
1710±10
1470±10
1088±2
840±2
874±2
870±10
793±2
$Na_2O \cdot SiO_2$
$Na_2O \cdot 2SiO_2$
Wt % SiO_2 →
50
60
70
80
90
SiO_2

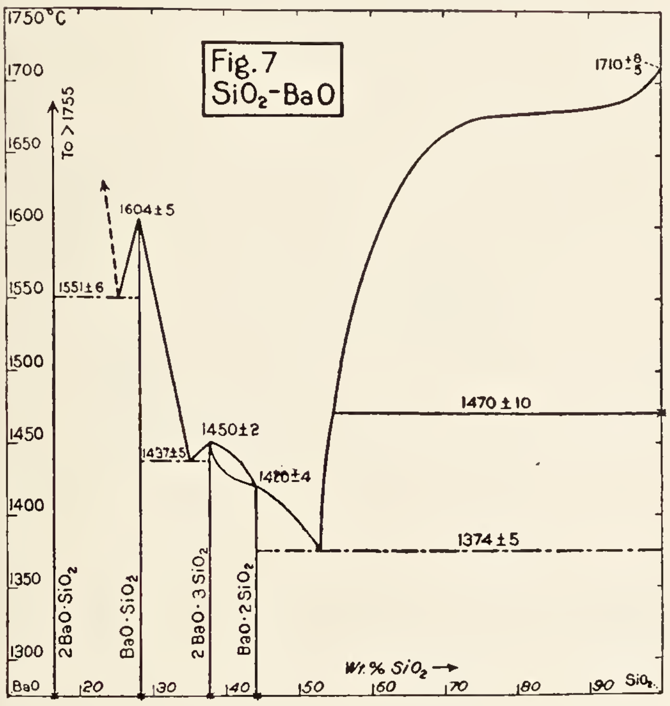


Fig. 7
SiO_2–BaO
1750°C
1700
1650
1600
1550
1500
1450
1400
1350
1300
To > 1755
1604±5
1551±6
1450±2
1437±5
1420±4
1470±10
1374±5
$2BaO \cdot SiO_2$
$BaO \cdot SiO_2$
$2BaO \cdot 3SiO_2$
$BaO \cdot 2SiO_2$
Wt % SiO_2 →
BaO
20
30
40
50
60
70
80
90
SiO_2

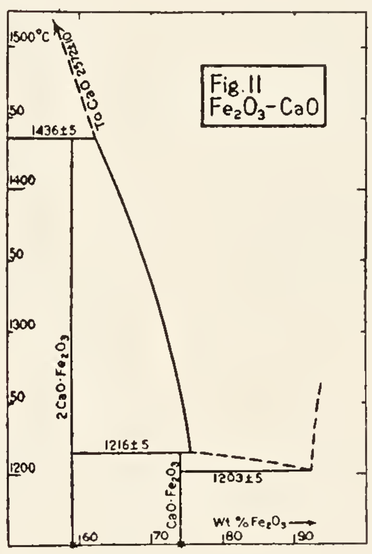


Fig. 11
Fe_2O_3–CaO
1500°C
To CaO 2572±20
1436±5
1400
1300
1200
1216±5
1203±5
$2CaO \cdot Fe_2O_3$
$CaO \cdot Fe_2O_3$
Wt % Fe_2O_3 →
60
70
80
90

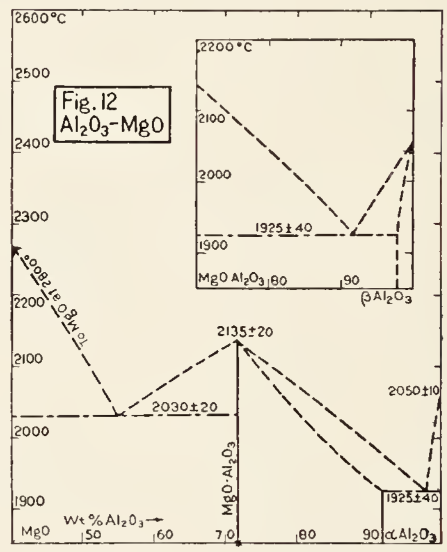


Fig. 12
Al_2O_3–MgO
2600°C
2500
2400
2300
2200
2100
2000
1900
2200°C
1925±40
$MgO \cdot Al_2O_3$
βAl_2O_3
To MgO 2800±
2135±20
2030±20
2050±10
1925±40
$MgO \cdot Al_2O_3$
MgO
Wt % Al_2O_3 →
50
60
70
80
90
αAl_2O_3

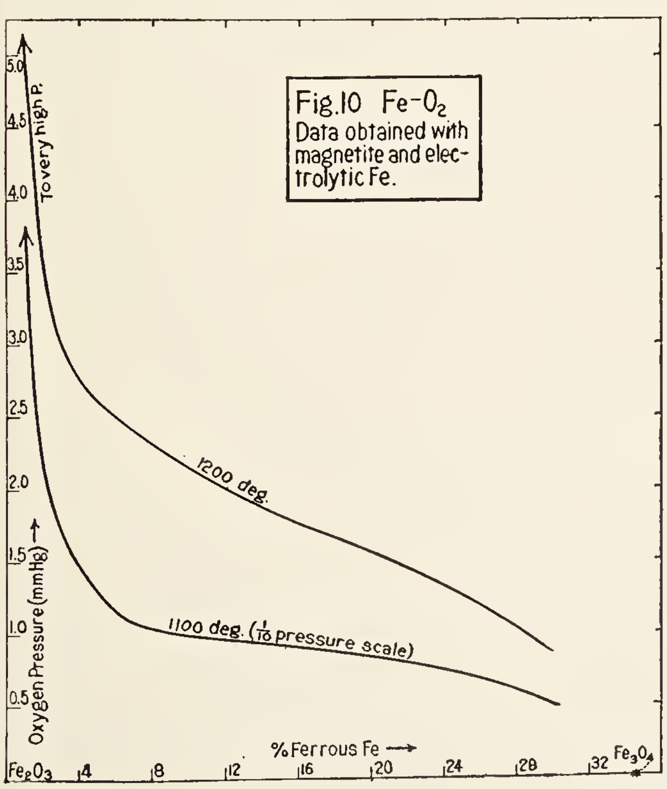


Fig. 10 Fe–O_2
Data obtained with magnetite and electrolytic Fe.
To very high P.
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
Oxygen Pressure (mmHg)
1200 deg.
1100 deg. ($\frac{1}{10}$ pressure scale)
% Ferrous Fe →
Fe_2O_3
4
8
12
16
20
24
28
32
Fe_3O_4

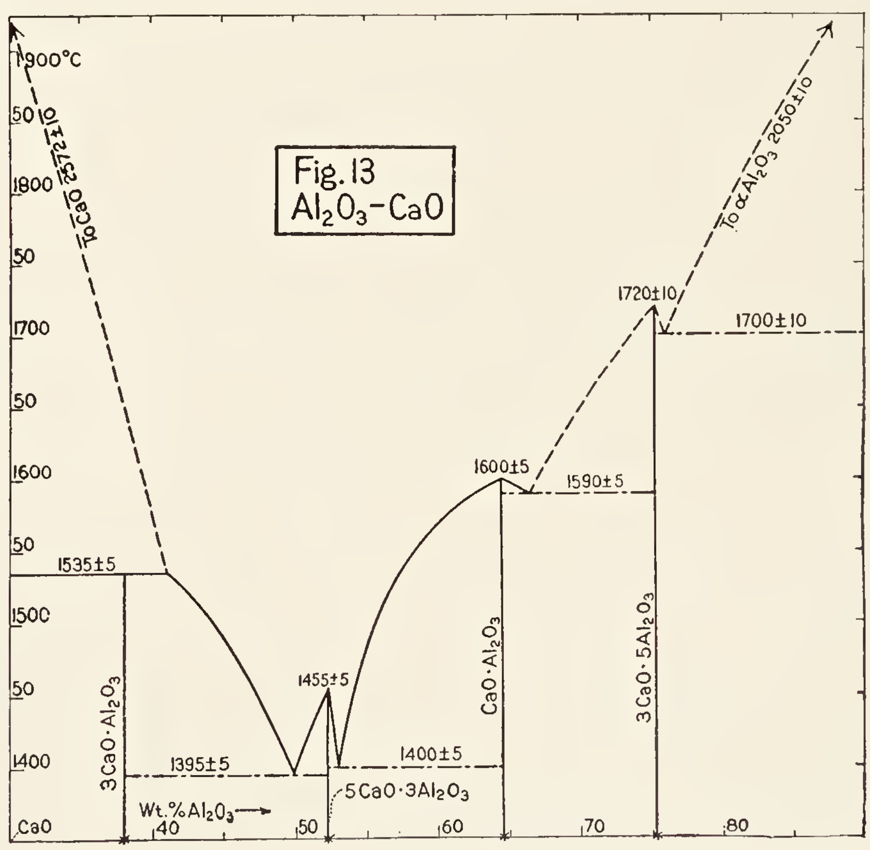


Fig. 13
Al_2O_3–CaO
1900°C
To CaO 2572±10
1800
1700
1600
1500
1400
1535±5
1455±5
1395±5
1400±5
1600±5
1590±5
1720±10
1700±10
To αAl_2O_3 2050±10
$3CaO \cdot Al_2O_3$
$5CaO \cdot 3Al_2O_3$
$CaO \cdot Al_2O_3$
$3CaO \cdot 5Al_2O_3$
Wt. % Al_2O_3 →
CaO
40
50
60
70
80

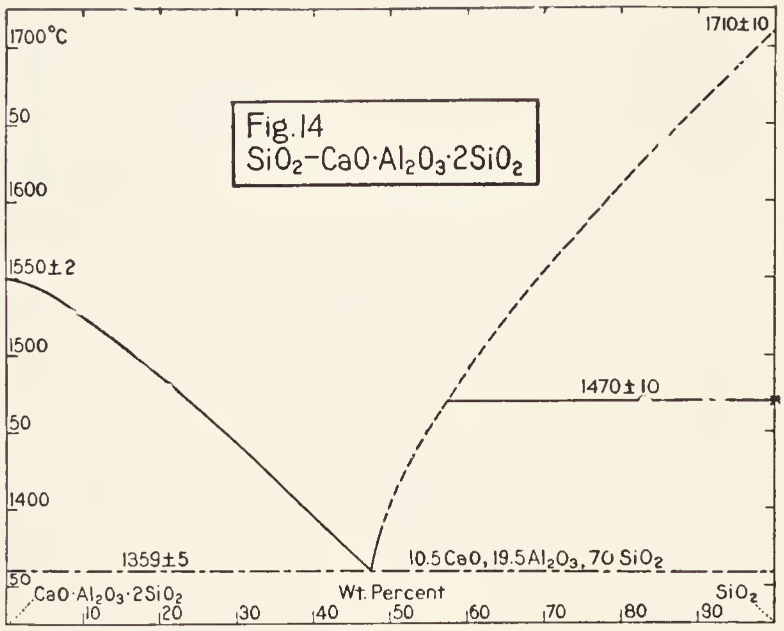


Fig. 14 SiO_2–$CaO \cdot Al_2O_3 \cdot 2SiO_2$

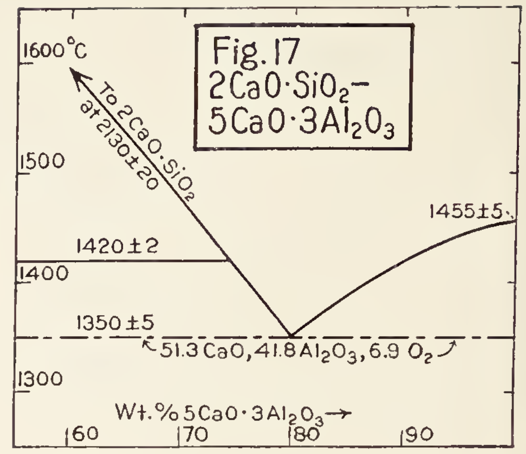


Fig. 17 $2CaO \cdot SiO_2$–$5CaO \cdot 3Al_2O_3$

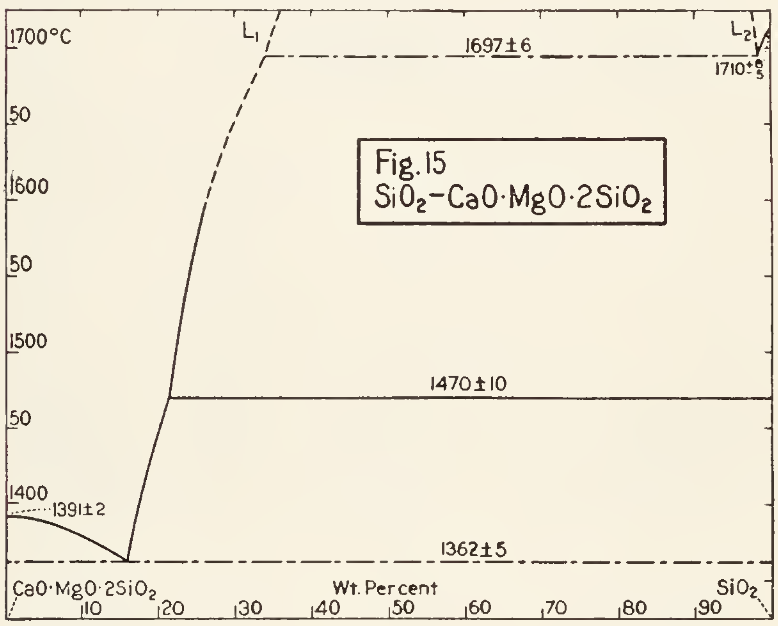


Fig. 15 SiO_2–$CaO \cdot MgO \cdot 2SiO_2$

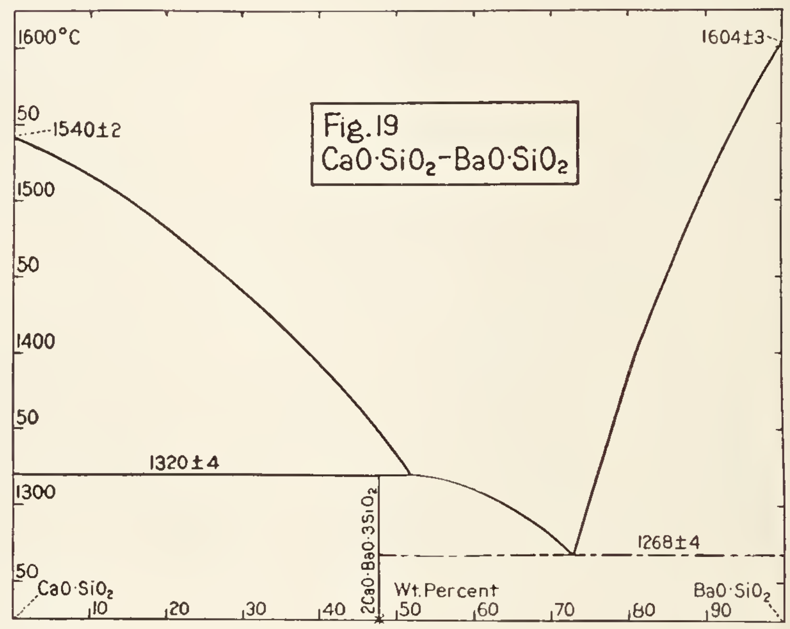


Fig. 19 $CaO \cdot SiO_2$–$BaO \cdot SiO_2$

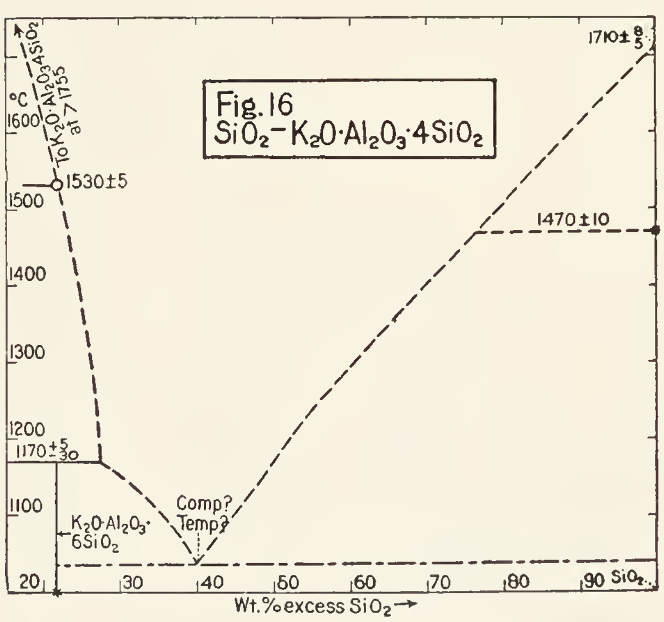


Fig. 16 SiO_2–$K_2O \cdot Al_2O_3 \cdot 4SiO_2$

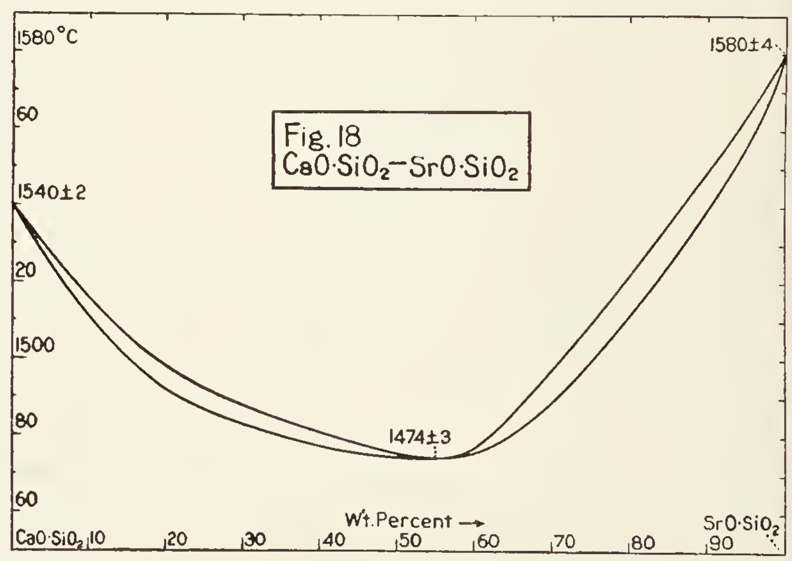


Fig. 18 $CaO \cdot SiO_2$–$SrO \cdot SiO_2$

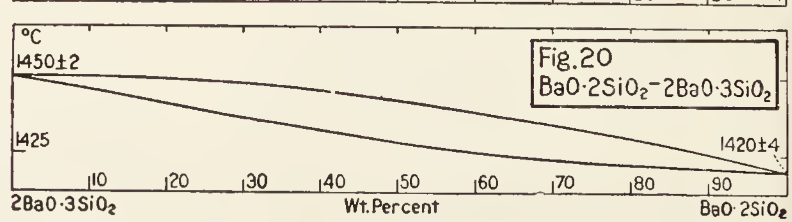


Fig. 20 $BaO \cdot 2SiO_2$–$2BaO \cdot 3SiO_2$

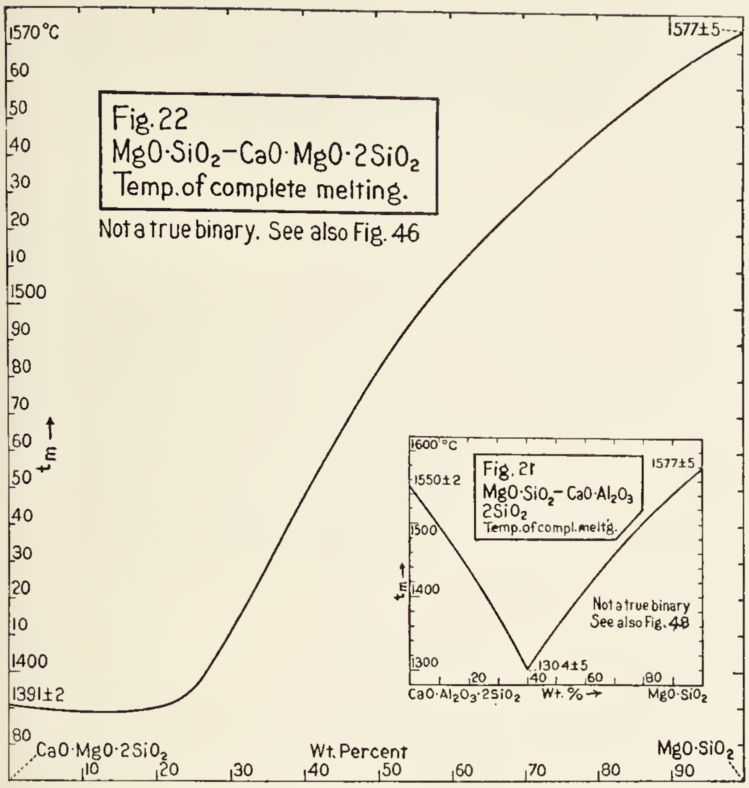


Fig. 22 $MgO\cdot SiO_2-CaO\cdot MgO\cdot 2SiO_2$ Temp. of complete melting.

Fig. 21 $MgO\cdot SiO_2-CaO\cdot Al_2O_3\cdot 2SiO_2$ Temp. of compl. meltg.

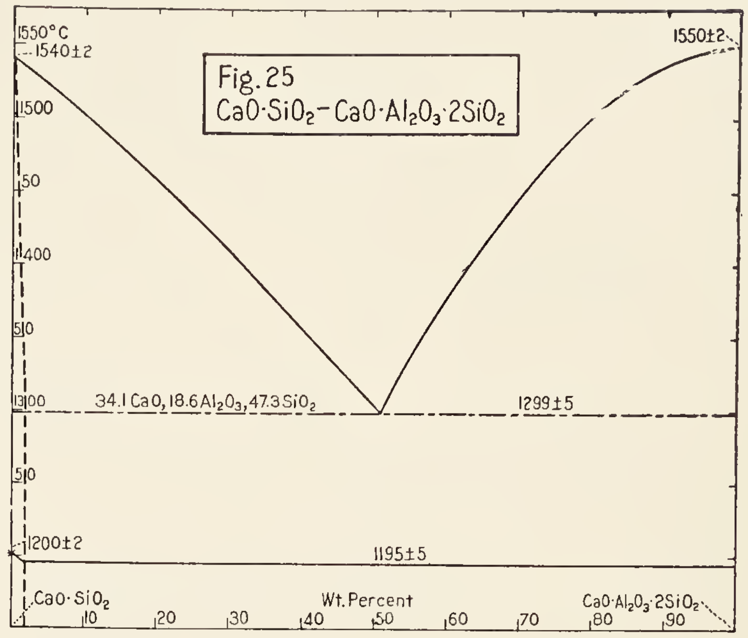


Fig. 25 $CaO\cdot SiO_2-CaO\cdot Al_2O_3\cdot 2SiO_2$

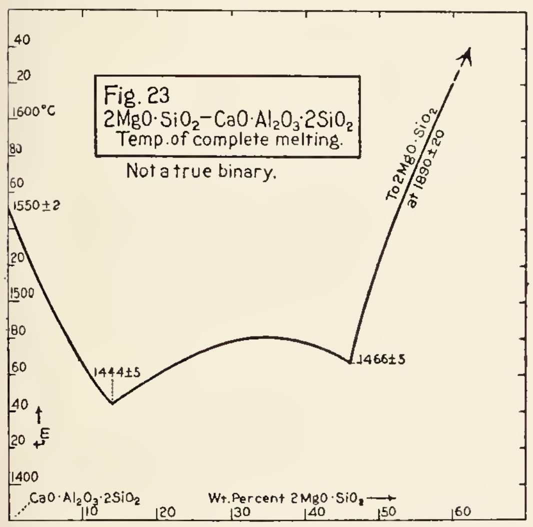


Fig. 23 $2MgO\cdot SiO_2-CaO\cdot Al_2O_3\cdot 2SiO_2$ Temp. of complete melting.

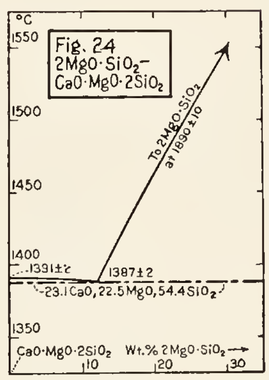


Fig. 24 $2MgO\cdot SiO_2-CaO\cdot MgO\cdot 2SiO_2$

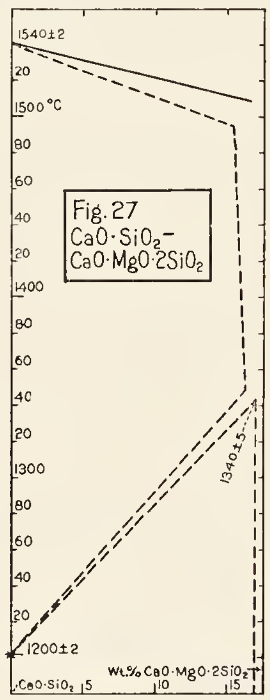


Fig. 27 $CaO\cdot SiO_2-CaO\cdot MgO\cdot 2SiO_2$

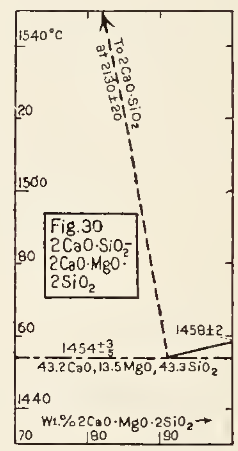


Fig. 30 $2CaO\cdot SiO_2-2CaO\cdot MgO\cdot 2SiO_2$

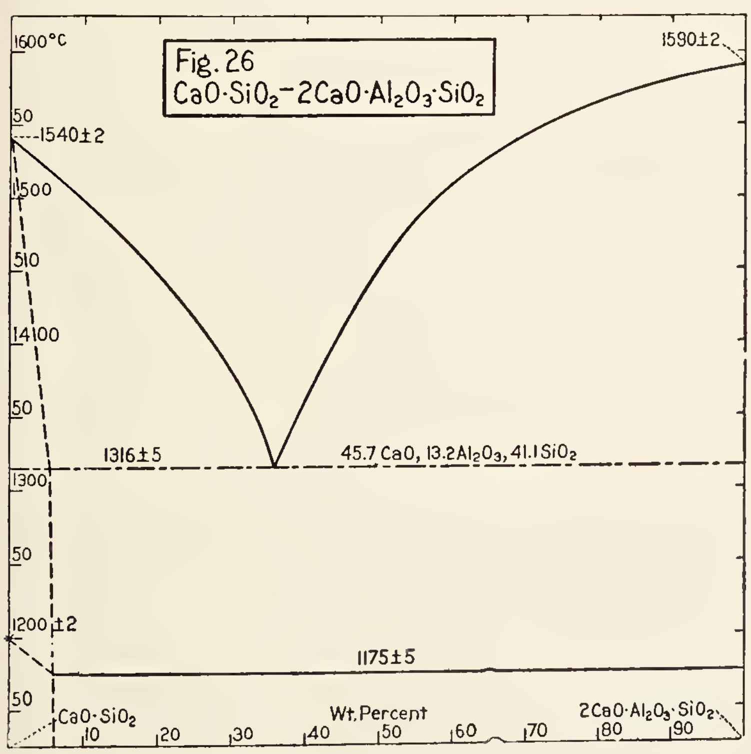


Fig. 26 $CaO\cdot SiO_2-2CaO\cdot Al_2O_3\cdot SiO_2$

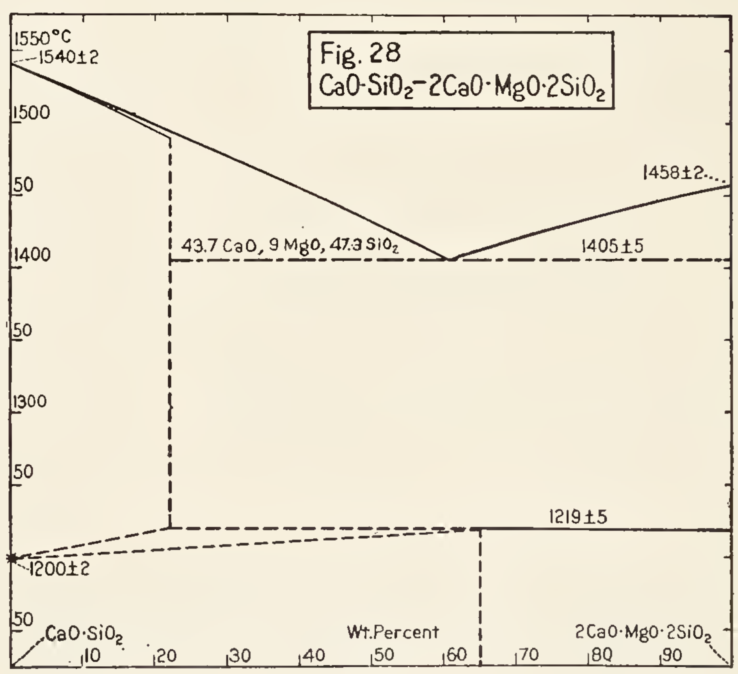


Fig. 28 $CaO\cdot SiO_2-2CaO\cdot MgO\cdot 2SiO_2$

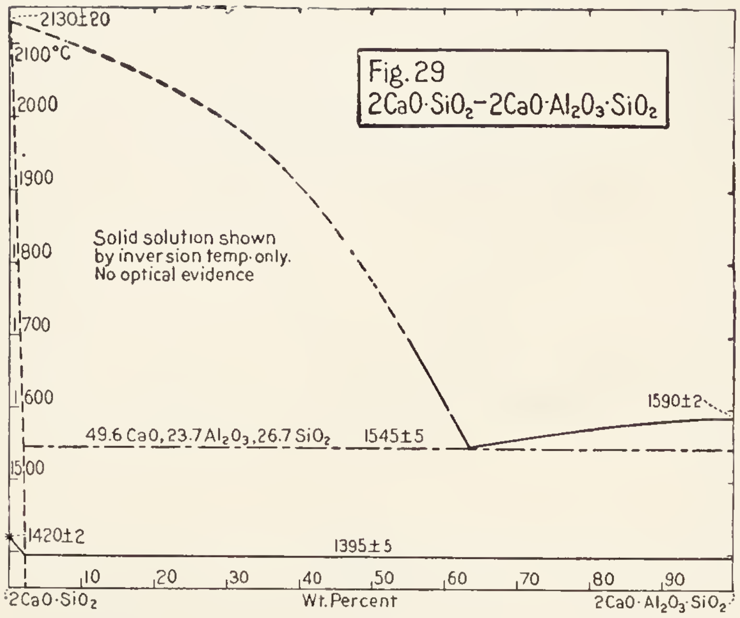


Fig. 29
2CaO·SiO₂–2CaO·Al₂O₃·SiO₂
2130±20
2100°C
2000
1900
1800
1700
1600
1500
Solid solution shown by inversion temp. only. No optical evidence
1590±2
49.6 CaO, 23.7 Al₂O₃, 26.7 SiO₂
1545±5
1420±2
1395±5
10 20 30 40 50 60 70 80 90
2CaO·SiO₂
Wt. Percent
2CaO·Al₂O₃·SiO₂

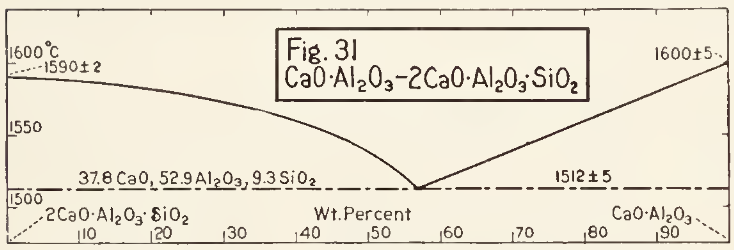


Fig. 31
CaO·Al₂O₃–2CaO·Al₂O₃·SiO₂
1600°C
1590±2
1600±5
1550
37.8 CaO, 52.9 Al₂O₃, 9.3 SiO₂
1512±5
1500
2CaO·Al₂O₃·SiO₂
Wt. Percent
CaO·Al₂O₃
10 20 30 40 50 60 70 80 90

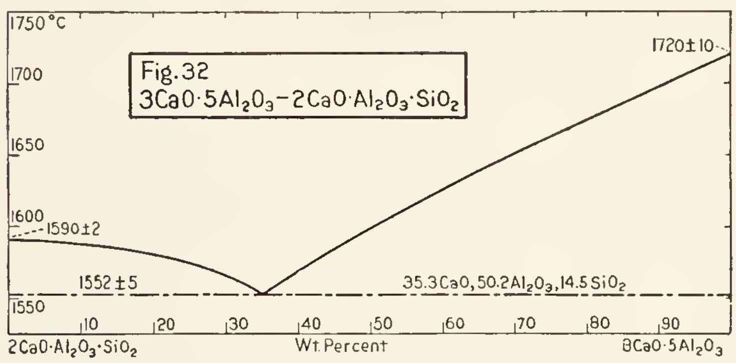


Fig. 32
3CaO·5Al₂O₃–2CaO·Al₂O₃·SiO₂
1750°C
1720±10
1700
1650
1600
1590±2
1552±5
35.3 CaO, 50.2 Al₂O₃, 14.5 SiO₂
1550
10 20 30 40 50 60 70 80 90
2CaO·Al₂O₃·SiO₂
Wt. Percent
3CaO·5Al₂O₃

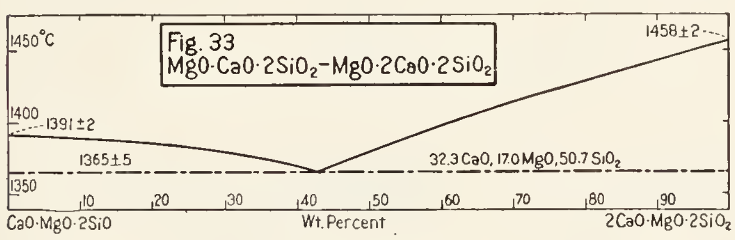


Fig. 33
MgO·CaO·2SiO₂–MgO·2CaO·2SiO₂
1450°C
1458±2
1400
1391±2
1365±5
32.3 CaO, 17.0 MgO, 50.7 SiO₂
1350
10 20 30 40 50 60 70 80 90
CaO·MgO·2SiO
Wt. Percent
2CaO·MgO·2SiO₂

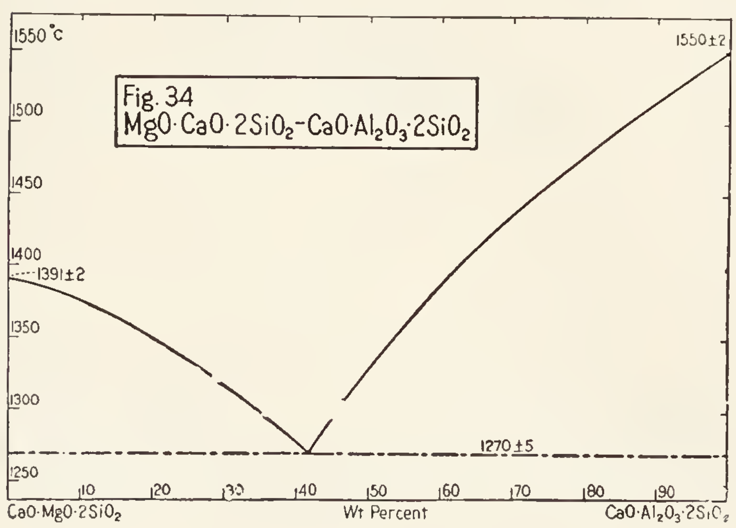


Fig. 34
MgO·CaO·2SiO₂–CaO·Al₂O₃·2SiO₂
1550°C
1550±2
1500
1450
1400
1391±2
1350
1300
1270±5
1250
10 20 30 40 50 60 70 80 90
CaO·MgO·2SiO₂
Wt Percent
CaO·Al₂O₃·2SiO₂

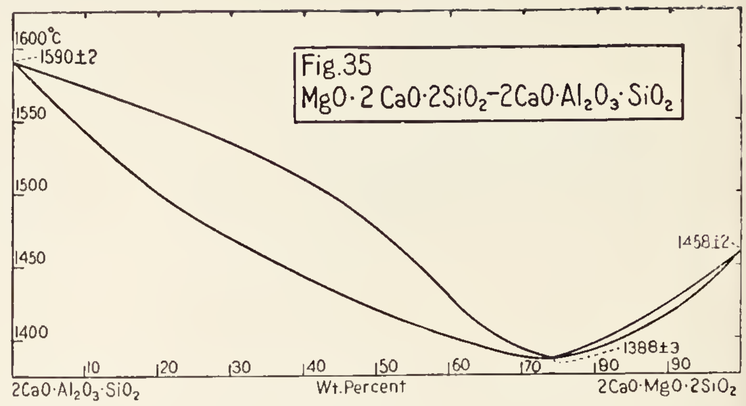


Fig. 35
MgO·2CaO·2SiO₂–2CaO·Al₂O₃·SiO₂
1600°C
1590±2
1550
1500
1450
1458±2
1400
1388±3
10 20 30 40 50 60 70 80 90
2CaO·Al₂O₃·SiO₂
Wt. Percent
2CaO·MgO·2SiO₂

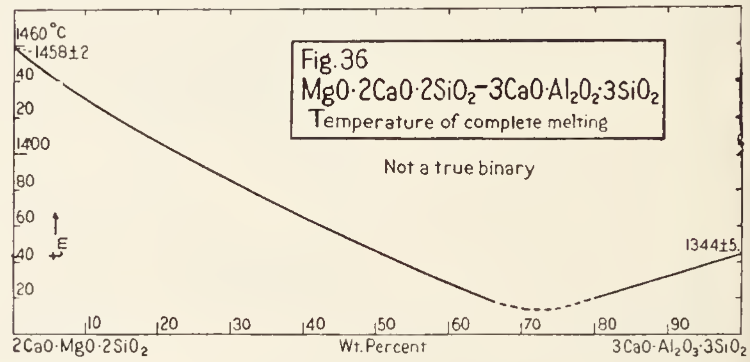


Fig. 36
MgO·2CaO·2SiO₂–3CaO·Al₂O₃·3SiO₂
Temperature of complete melting
Not a true binary
1460°C
1458±2
40
20
1400
80
60
40
20
tm
1344±5
10 20 30 40 50 60 70 80 90
2CaO·MgO·2SiO₂
Wt. Percent
3CaO·Al₂O₃·3SiO₂

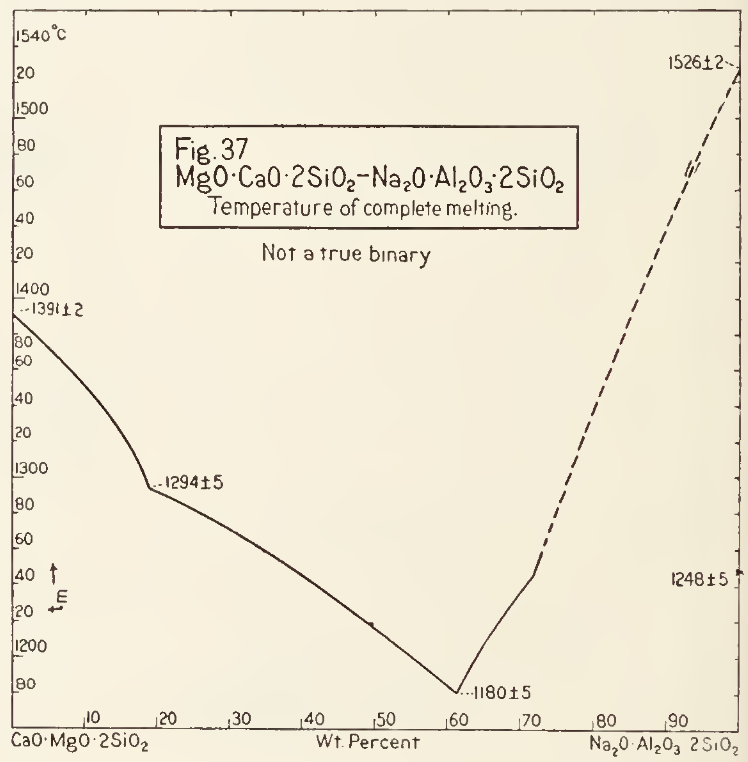


Fig. 37
MgO·CaO·2SiO₂–Na₂O·Al₂O₃·2SiO₂
Temperature of complete melting.
Not a true binary
1540°C
20
1500
80
60
40
20
1400
1391±2
80
60
40
20
1300
1294±5
80
60
40
20
1200
80
tm
1526±2
1248±5
1180±5
10 20 30 40 50 60 70 80 90
CaO·MgO·2SiO₂
Wt. Percent
Na₂O·Al₂O₃·2SiO₂

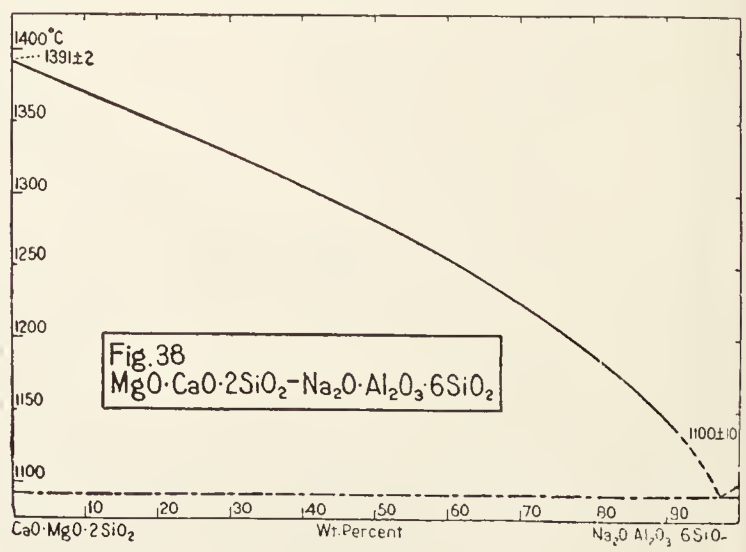


Fig. 38
MgO·CaO·2SiO₂–Na₂O·Al₂O₃·6SiO₂
1400°C
1391±2
1350
1300
1250
1200
1150
1100
1100±10
10 20 30 40 50 60 70 80 90
CaO·MgO·2SiO₂
Wt. Percent

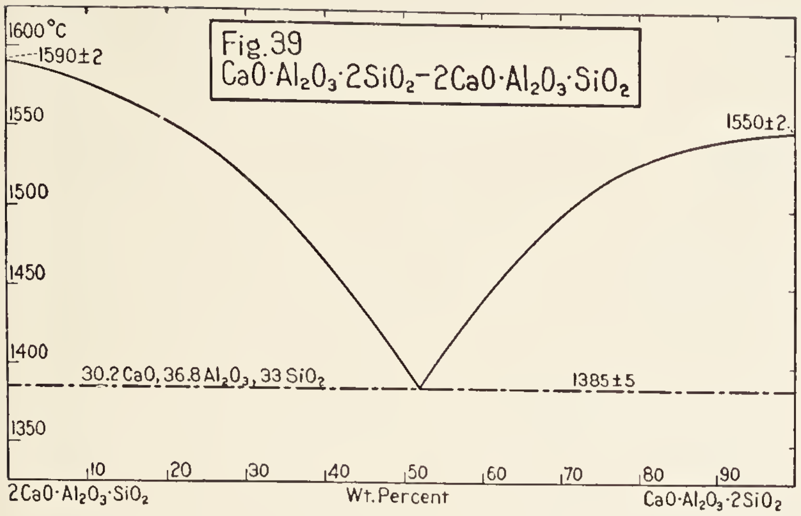


Fig. 39
$CaO \cdot Al_2O_3 \cdot 2SiO_2 - 2CaO \cdot Al_2O_3 \cdot SiO_2$

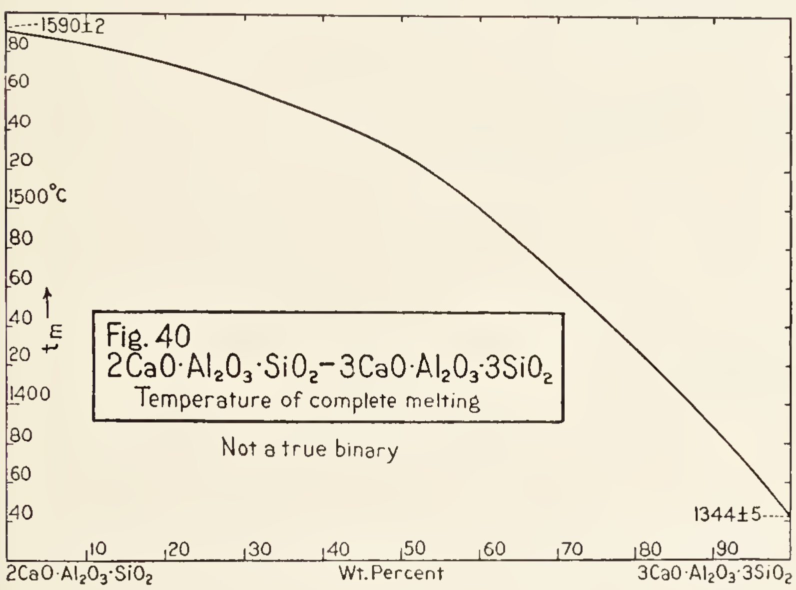


Fig. 40
$2CaO \cdot Al_2O_3 \cdot SiO_2 - 3CaO \cdot Al_2O_3 \cdot 3SiO_2$
Temperature of complete melting

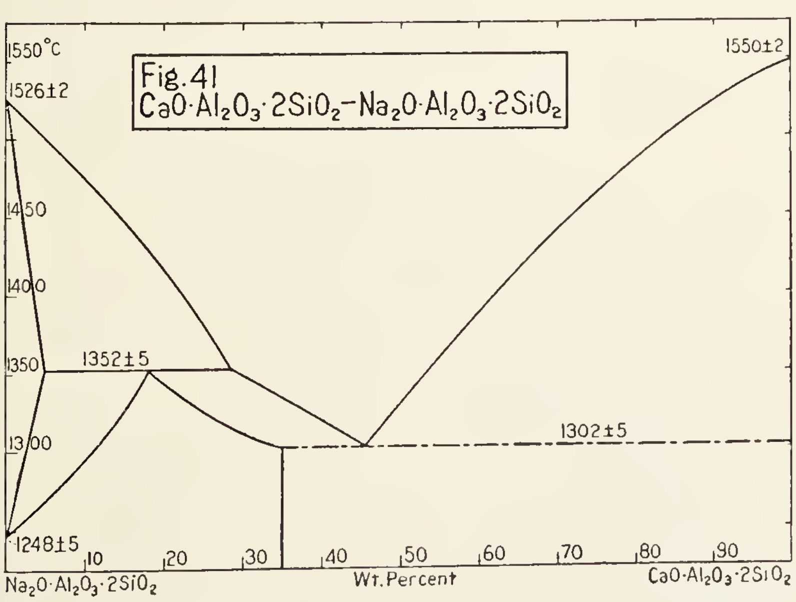


Fig. 41
$CaO \cdot Al_2O_3 \cdot 2SiO_2 - Na_2O \cdot Al_2O_3 \cdot 2SiO_2$

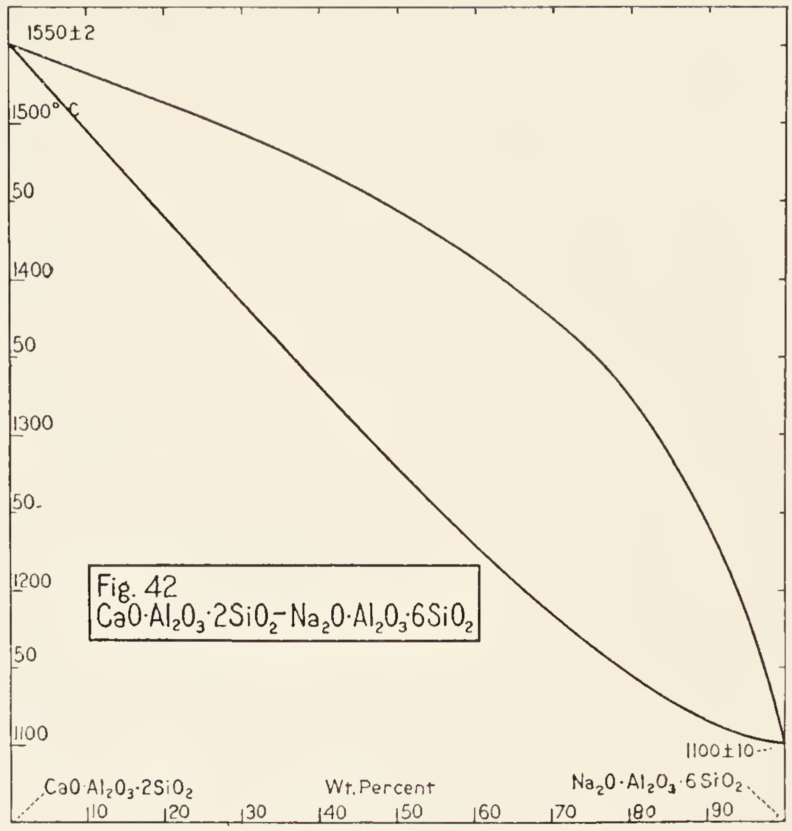


Fig. 42
$CaO \cdot Al_2O_3 \cdot 2SiO_2 - Na_2O \cdot Al_2O_3 \cdot 6SiO_2$

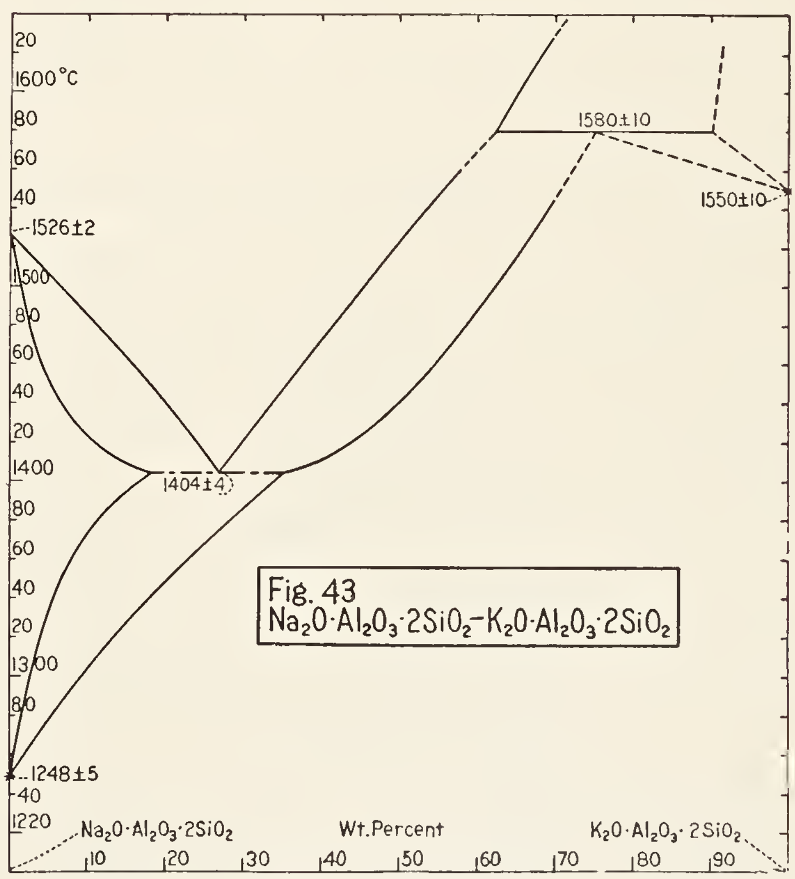


Fig. 43
$Na_2O \cdot Al_2O_3 \cdot 2SiO_2 - K_2O \cdot Al_2O_3 \cdot 2SiO_2$

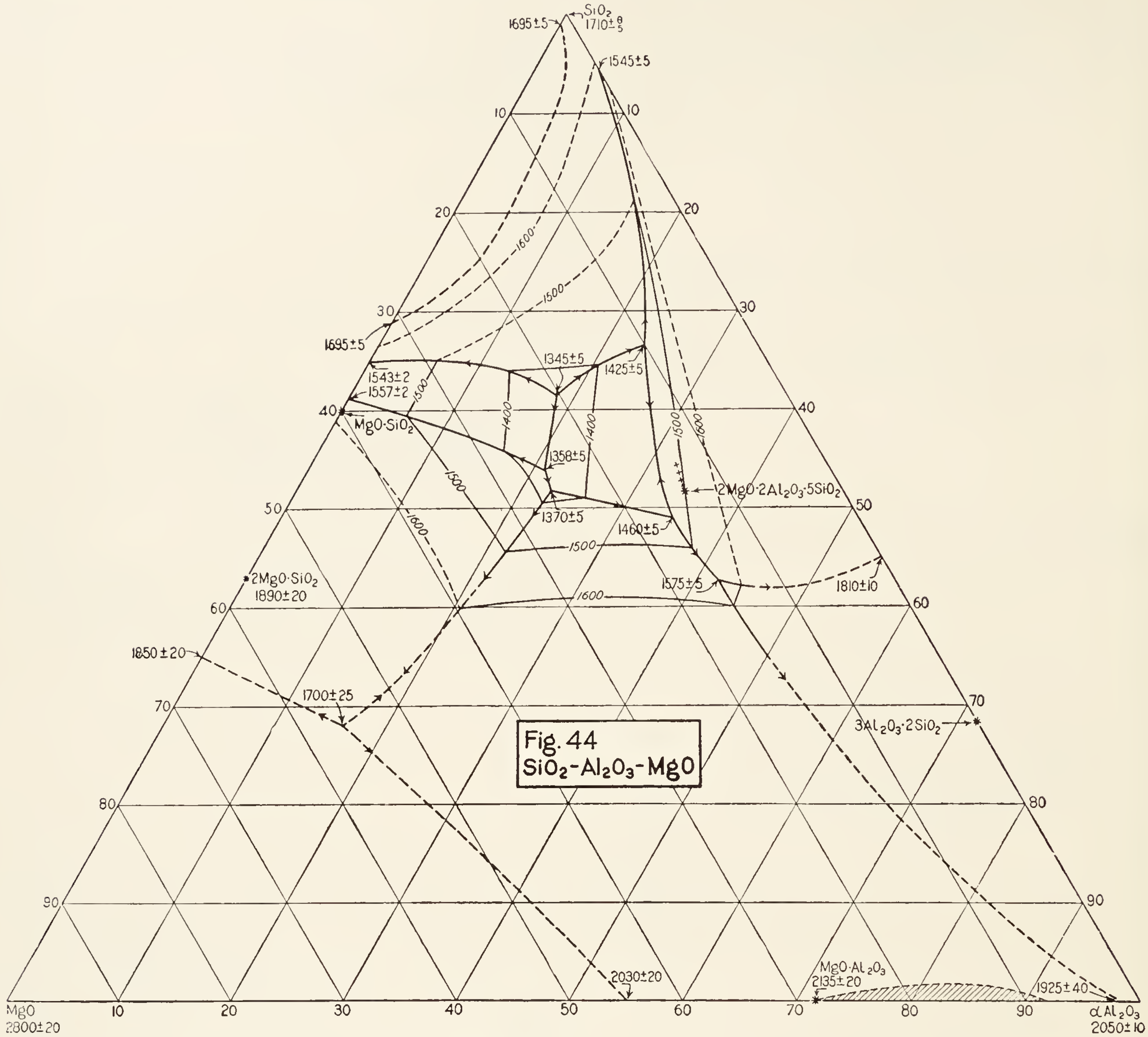


Fig. 44 SiO_2-Al_2O_3-MgO

One Binary + One Ternary Compound.—(*Continued*)

Binary	Ternary	Lit.
$2CaO.SiO_2$	$2CaO.Al_2O_3.SiO_2$	(113); *v.* Fig. 29
	$2CaO.MgO.2SiO_2$	(50); *v.* Fig. 30
$CaO.Al_2O_3$	$2CaO.Al_2O_3.SiO_2$	(113); *v.* Fig. 31
$3CaO.5Al_2O_3$	$2CaO.Al_2O_3.SiO_2$	(113); *v.* Fig. 32
$Na_2O.2SiO_2$	$Na_2O.2CaO.3SiO_2$	(100)

Two Ternary Compounds

A	B	Lit. and remarks
$MgO.CaO.2SiO_2$	$MgO.2CaO.2SiO_2$	(50); *v.* Fig. 33
	$CaO.Al_2O_3.2SiO_2$	(13); *v.* Fig. 34
$MgO.2CaO.2SiO_2$	$2CaO.Al_2O_3.SiO_2$	(48); *v.* Fig. 35
	$3CaO.Al_2O_3.3SiO_2$	(24); *v.* Fig. 36
	$[10(3Na_2O.Al_2O_3.3SiO_2)$	Not a true binary
	$90(3CaO.Al_2O_3.3SiO_2)]$	(24)
$MgO.CaO.2SiO_2$	$Na_2O.Al_2O_3.2SiO_2$	(17); *v.* Fig. 37
	$Na_2O.Al_2O_3.6SiO_2$	(13); *v.* Fig. 38
$CaO.Al_2O_3.2SiO_2$	$2CaO.Al_2O_3.SiO_2$	(113); *v.* Fig. 39
$2CaO.Al_2O_3.SiO_2$	$3CaO.Al_2O_3.3SiO_2$	(24); *v.* Fig. 40

A	B	Lit. and remarks
$CaO.Al_2O_3.2SiO_2$	$SrO.Al_2O_3.2SiO_2$	Probably complete solid solution (42)
	$Na_2O.Al_2O_3.2SiO_2$	(9); *v.* Fig. 41
	$Na_2O.Al_2O_3.6SiO_2$	(10, 11); *v.* Fig. 42
$2CaO.Al_2O_3.SiO_2$	$10(3Na_2O.Al_2O_3.3SiO_2)$	Not a true binary
	$90(3CaO.Al_2O_3.3SiO_2)$	(24)
$Na_2O.Al_2O_3.2SiO_2$	$K_2O.Al_2O_3.2SiO_2$	(14); *v.* Fig. 43

THREE-COMPONENT SYSTEMS

SiO_2-O-Fe (151)	SiO_2-Al_2O_3-BaO (147)
SiO_2-TiO_2-MnO (25)	SiO_2-Al_2O_3-Li_2O (5)
SiO_2-TiO_2-CaO (133)	SiO_2-Al_2O_3-Na_2O (114)
SiO_2-ZrO_2-Li_2O (126)	SiO_2-Al_2O_3-K_2O (114)
SiO_2-MnO-FeO (84)	SiO_2-CaO-Li_2O (126)
SiO_2-MnO-Al_2O_3 (25)	TiO_2-MnO-Al_2O_3 (25)
SiO_2-FeO-MgO* (61)	Fe_2O_3-Al_2O_3-CaO (26)
SiO_2-FeO-CaO (91)	

* Immiscibility extends across ternary system. L_1 = 20MgO, 15FeO, 65SiO_2, Wt. %.

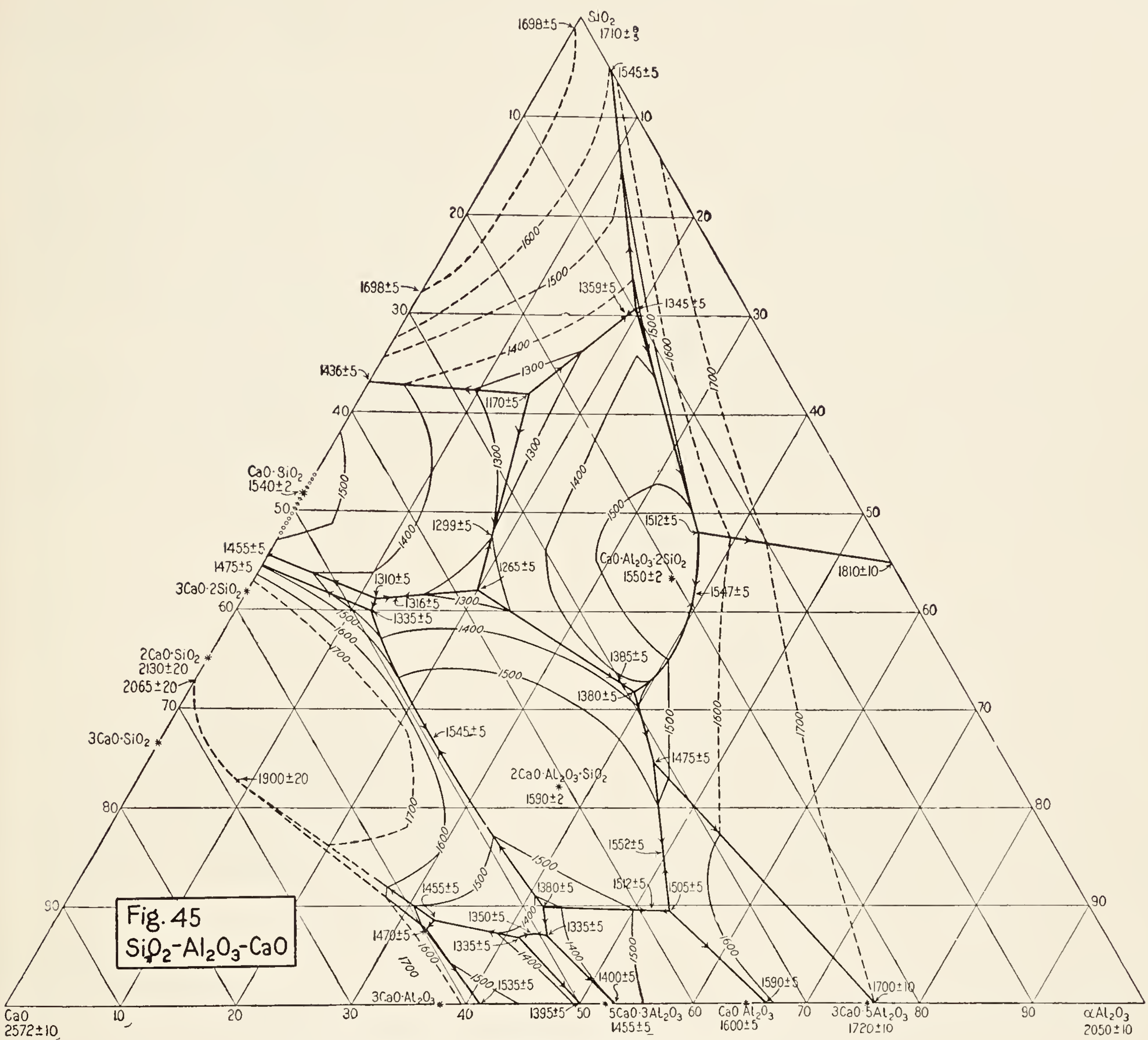


Fig. 45.—Composition of Mullite, $3Al_2O_3.2SiO_2$ not shown. *See* Fig. 44.

THREE-COMPONENT SYSTEMS.—(*Continued*)

$2CaO.Al_2O_3.SiO_2$-$3CaO.Al_2O_3.3SiO_2$-$2CaO.MgO.2SiO_2$ ([24]); *v.* Fig. 50

For other systems, *v.* ([24]); Figs. 52, 53.

SiO_2-Al_2O_3-MgO ([20, 61, 112]); *v.* Fig. 44

Ternary compound

$2MgO.2Al_2O_3.5SiO_2$ forms solid solutions and melts incongruently.

Eutectics and quadruple points

t, °C	Solid phases	Point \ Wt. %	A, SiO_2	B, Al_2O_3	C, MgO
1345 ± 5	$A_5.B_2.C_2$(mix.) + AC + A	E	61.4	18.3	20.3
1700 ± 25	AC_2 + BC + C	E	28	16	56
1358 ± 5	$A_5B_2C_2$ + AC + AC_2	E	54	21	25
1425 ± 5	$A_5B_2C_2$ + A_2B_3 + A	Q	66.5	23.5	10
1460 ± 5	$A_5B_2C_2$ + BC + A_2B_3	Q	49.1	34.8	16.1
1370 ± 5	$A_5B_2C_2$ + BC + AC_2	Q	51.5	22.8	25.7
1575 ± 5	A_2B_3 + BC + B	Q	42.8	42	15.2

Points on field boundaries, Wt. %

Field 1	Field 2	A, SiO_2	B, Al_2O_3	C, MgO
$3Al_2O_3.2SiO_2$	SiO_2	77	18	5
	$2MgO.2Al_2O_3.5SiO_2$	86	12	2
	$Al_2O_3.MgO$	57	29	14
$2MgO.SiO_2$	$MgO.Al_2O_3$	45	39	16
$2MgO.2Al_2O_3.5SiO_2$	SiO_2	42	21	37
$MgO.SiO_2$	SiO_2	64	20	16
	$2MgO.SiO_2$	64	12	24
Al_2O_3	$MgO.Al_2O_3$	65	5	30
$3Al_2O_3.2SiO_2$	$2MgO.2Al_2O_3.5SiO_2$	58.2	10	31.8
$2MgO.2Al_2O_3.5SiO_2$	$MgO.SiO_2$	24	63	13

Max. temps. occur but not well defined.

Immiscibility curves

L_1	L_2	85.0	4.5	10.5
		75.0	4.5	20.5

The silica liquidus is discontinuous ([61]); *see* the one- and two-component systems; for solid solution, *v.* ([112]).

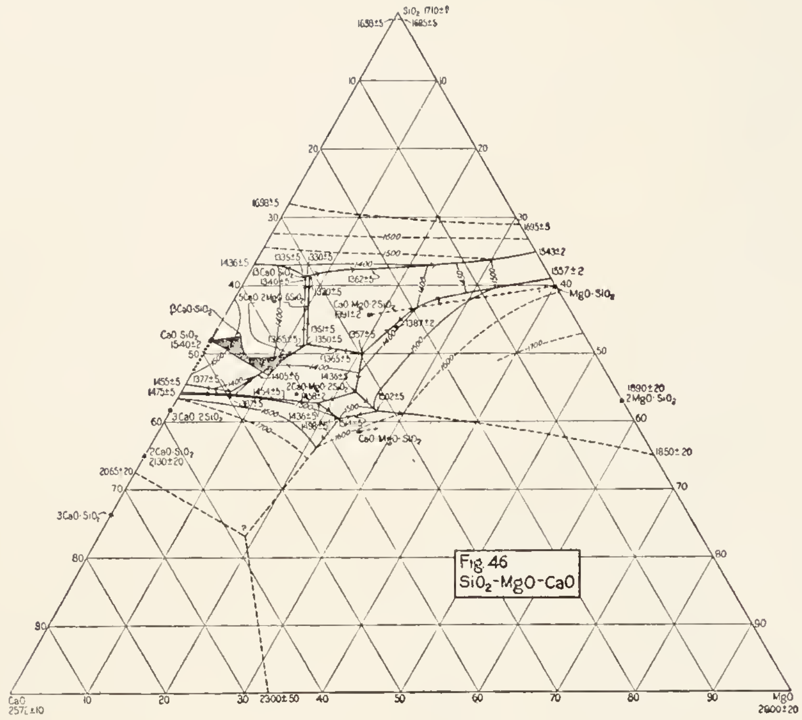
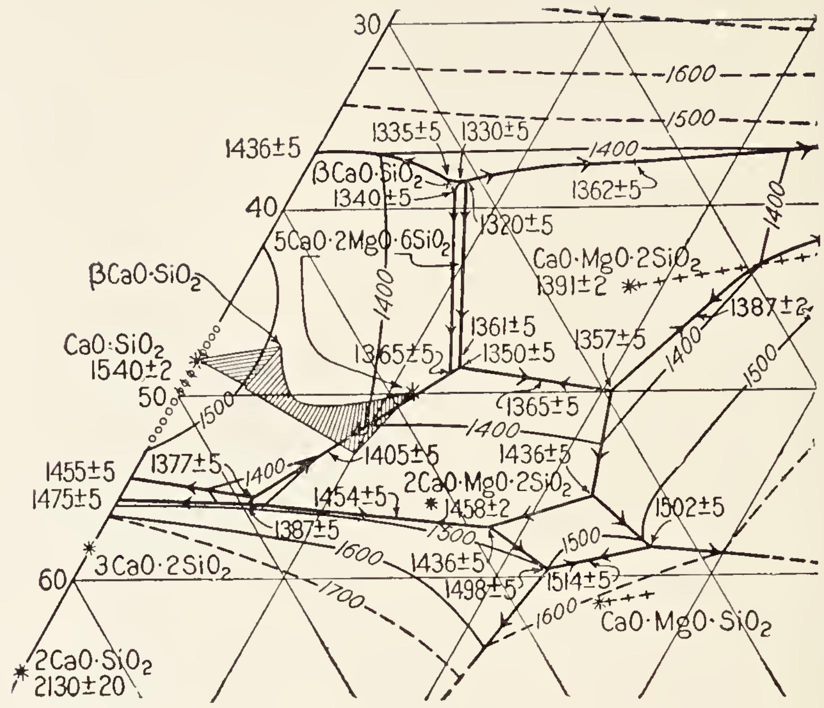


Fig 46
SiO_2-MgO-CaO



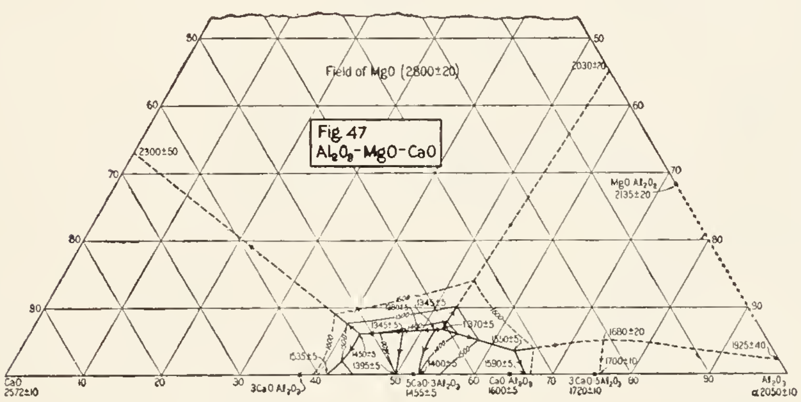
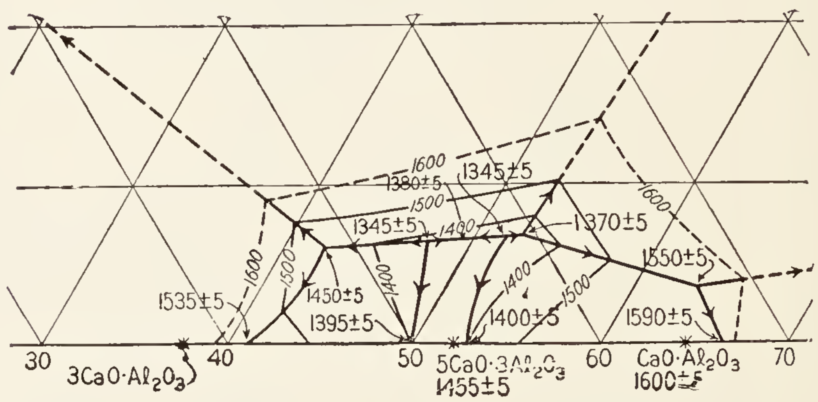


Fig 47
Al_2O_3-MgO-CaO



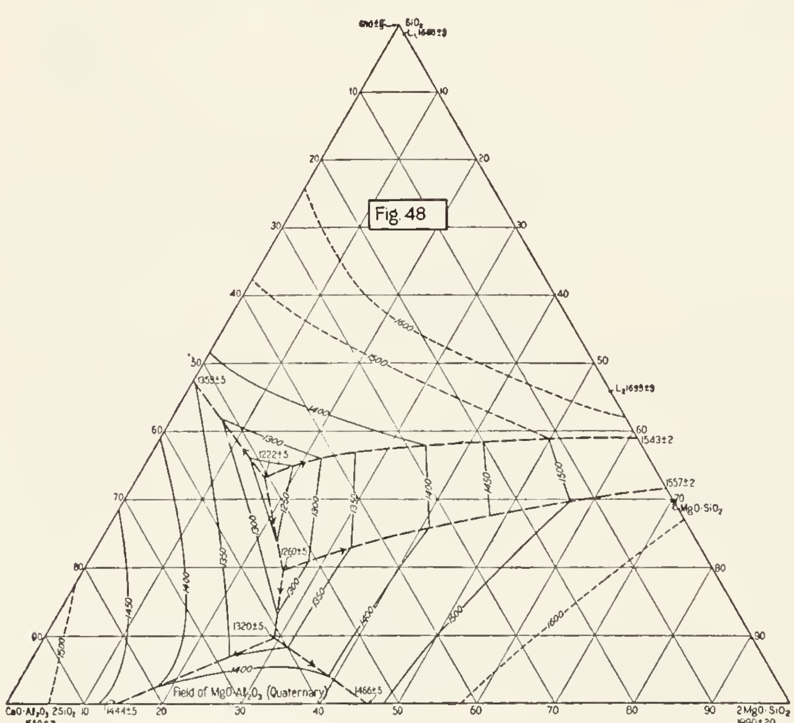


Fig 48

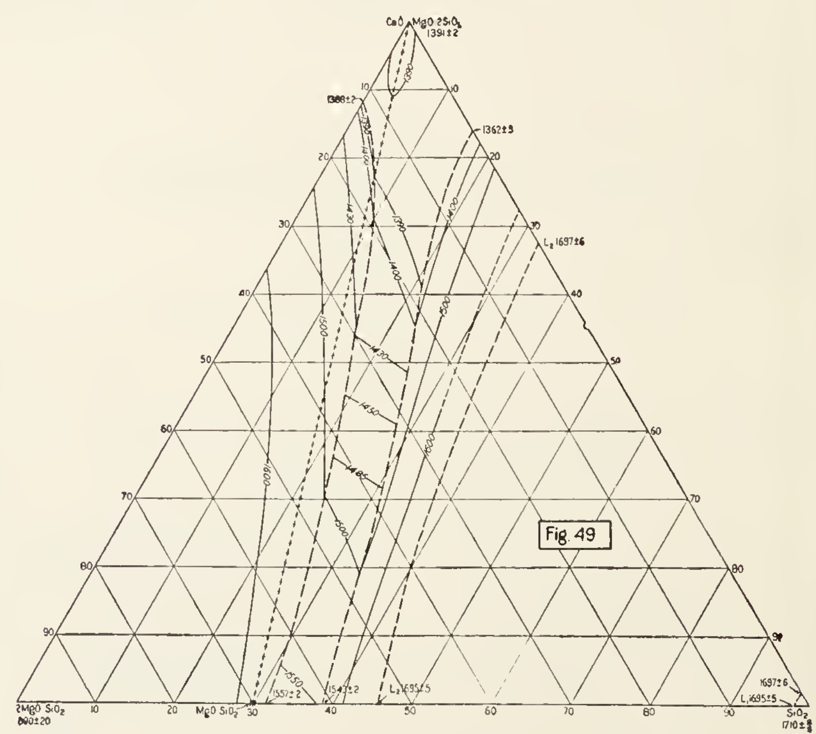
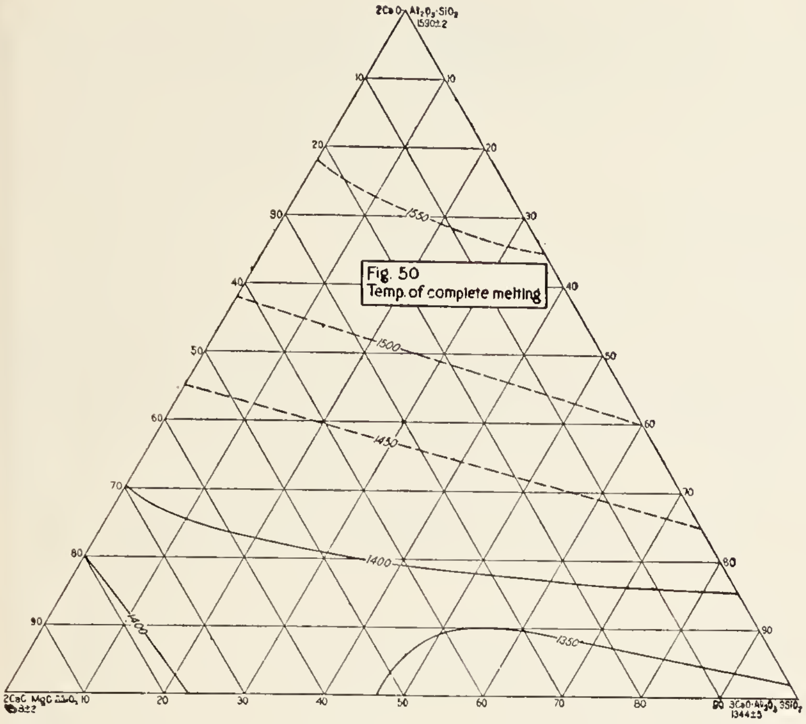
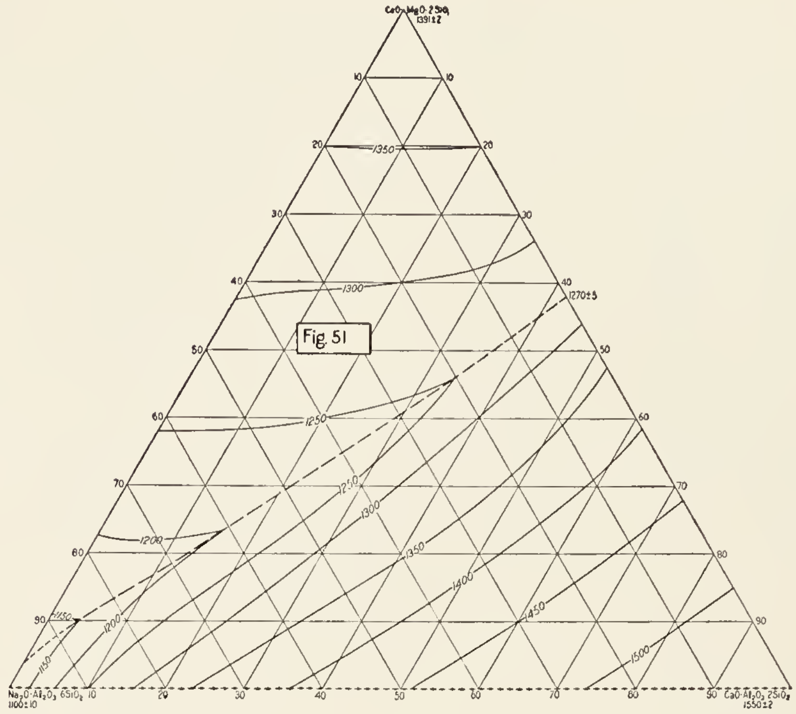
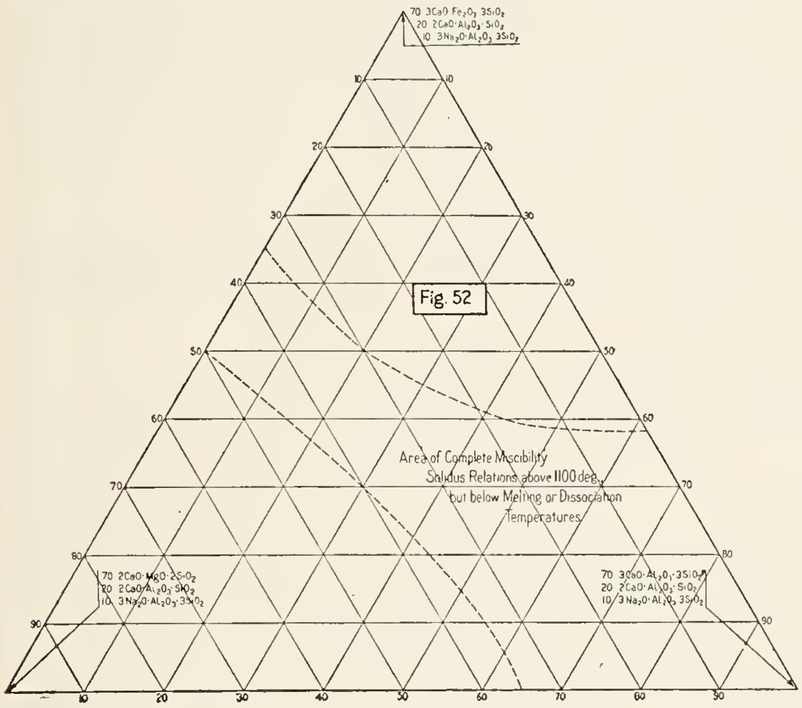
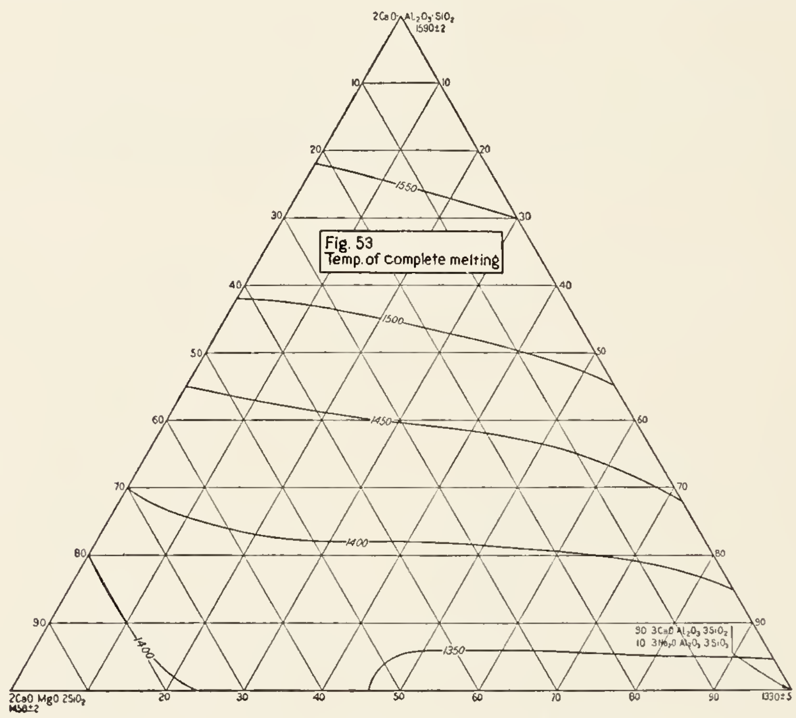


Fig 49









SiO_2-Al_2O_3-CaO (18, 20, 61, 75, 76, 77, 113, 129); *v.* Fig. 45

Ternary compounds

$CaO.Al_2O_3.2SiO_2$: m, 1550 ± 2; $2CaO.Al_2O_3.SiO_2$: m, 1590 ± 2; $3CaO.Al_2O_3.SiO_2$: d, 1335 ± 5 into $\beta 2CaO.SiO_2$ + $CaO.Al_2O_3$; *see* one-component system.

Eutectics and quadruple points

t, °C	Solid phases	Point (W. %)	A, SiO_2	B, Al_2O_3	C, CaO
1170 ± 5	$A_2BC + A + AC$	E	62.0	14.7	23.3
1345 ± 5	$A_2BC + A + A_2B_3$	E	70.4	19.8	9.8
1265 ± 5	$A_2BC + ABC_2 + \alpha AC$	E	42	20	38
1310 ± 5	$ABC_2 + A_2C_3 + \alpha AC$	E	41	11.8	47.2
1505 ± 5	$ABC_2 + BC + B_5C_3$	E	9.25	53.25	37.5
1380 ± 5	$A_2BC + ABC_2 + \alpha B$	E	31.8	39	29.2
1335 ± 5	$\beta AC_2 + BC + B_3C_5$	E	6.8	43.7	49.5
1335 ± 5	$\beta AC_2 + BC_3 + B_3C_5$	E	6.8	41.2	52
1512 ± 5	$A_2BC + \alpha B + A_2B_3$	Q	47.9	36.5	15.6
1380 ± 5	$ABC_2 + \beta AC_2 + BC$	Q	9.7	42	48.3
1475 ± 5	$ABC_2 + B_5C_3 + \alpha B$	Q	24.3	44.5	31.2
1335 ± 5	$ABC_2 + A_2C_3 + \beta AC_2$	Q	39.9	11.9	48.2
1455 ± 5	$AC_3 + BC_3 + \alpha AC_2$	Q	8.7	33	58.3
1470 ± 5	$C + AC_3 + BC_3$	Q	7.5	32.8	59.7
1900 ± 20	$C + \alpha AC_2 + AC_3$	Q	22.4	9.2	68.4

Points on field boundaries, Wt. %

Field 1	Field 2	A, SiO_2	B, Al_2O_3	C, CaO
$CaO.Al_2O_3.2SiO_2$	$3Al_2O_3.2SiO_2$	39	40	21
		34.7	40.3	25
$\beta 2CaO.SiO_2$	$5CaO.3Al_2O_3$	7	42	51
$2CaO.SiO_2$	$2CaO.Al_2O_3.SiO_2$	16.8	34	49.2
		33	17.5	49.5
Immiscibility (61) L_1 =		85	2.5	12.5

The silica liquidus is discontinuous (18, 61); *see* the two-component systems

SiO_2-MgO-CaO (12, 50, 51, 61); *v.* Fig. 46

Ternary compounds

$CaO.MgO.2SiO_2$: m, 1391 ± 2; $2CaO.MgO.2SiO_2$: m, 1458 ± 2; $CaO.MgO.SiO_2$: solid solution extends to CaO, 33; MgO, 28; SiO_2, 39; pure compound not stable in presence of melt; $5CaO.2MgO.6SiO_2$(?): d, 1365 ± 5 into $\alpha CaO.SiO_2$ + liquid.

SiO_2-MgO-CaO.—(*Continued*)

Eutectics and quadruple points

t, °C	Solid phases	Point (Wt. %)	A, SiO_2	B, MgO	C, CaO
1320 ± 5	$A_2BC + A_6B_2C_5 + A$	E	61.4	8	30.6
1350 ± 5	$A_6B_2C_5 + A_2BC + A_2BC_2$	E	51.4	12.6	36
1357 ± 5	$A_2BC_2 + A_2BC + AB_2$	E	50	20.2	29.8
1377 ± 5	$A_2BC_2 + AC + A_2C_3$	E	44.5	6.3	49.2
1436 ± 5	A_2BC_2 + ABC(mix.) + AC_2	E	42.7	18.3	39
?	$AC_2 + B + C$	E	?	?	?
1330 ± 5	βAC(mix.)+$A_6B_2C_5$(mix.)+A	Q	61.4	7.6	30.9
1335 ± 5	αAC(mix.) + βAC(mix.) + A	Q	61.5	7.2	31.3
1340 ± 5	αAC(mix.) + βAC(mix) + A_6-B_2C_5(mix.)	Q	61	7.6	31.4
1365 ± 5	αAC(mix.) + $A_6B_2C_5 + A_2BC_2$	Q	51	12.3	36.7
1387 ± 5	$\beta AC_2 + A_2C_3 + A_2BC_2$	Q	44.3	6.2	49.5
1436 ± 5	A_2BC_2 + ABC(mix.) + AB_2	Q	44.4	22.3	33.3
1498 ± 5	ABC(mix.) + αAC_2 + B	Q	40.4	22.3	37.3
1502 ± 5	ABC(mix.) + AB_2 + B	Q	41.5	26.4	32.1

Points on field boundaries, Wt. %

Field 1	Field 2	A, SiO_2	B, MgO	C, CaO
SiO_2	$CaO.SiO_2$	63	3	34
$CaO.MgO.2SiO_2$	SiO_2	62.4	15.6	22
		62	10	28
$CaO.MgO.2SiO_2$(mix.)	$2MgO.SiO_2$	54.3	22.7	23.0
		57	24	19
		59	30	11
Immiscibility (61) L_1 =		70	17	13

The extensive solid solutions found in this system cannot properly be given here; *see* (12, 50, 51) for details; refer to the one-component and two-component systems involved, and also the ternary system, $CaO.MgO.2SiO_2$-$2MgO.SiO_2$-SiO_2. The silica liquidus is discontinuous (18, 61).

SiO_2-CaO-Na_2O (100); *see also* Vol. II, p. 97

Ternary eutectics and quadruple points

t, °C	Solid phases	Point (Wt. %)	A, SiO_2	B, CaO	C, Na_2O
725 ± 5	$A_2C + A_6B_3C$ + quartz	E	73.5	5.2	21.3
821 ± 5	$AC + A_2C + A_3BC_2$	E	60.7	1.8	37.5
827 ± 5	$A_2C + A_3BC_2 + A_3B_2C$	Q	61.4	2.0	36.6
740 ± 5	$A_2C + A_3B_2C + A_6B_3C$	Q	70.7	5.2	24.1
1030 ± 10	$A_3B_2C + A_6B_3C + \beta AB$	Q	66.5	14.5	19
ca. 1030	$A_6B_3C + \beta AB$ + tridymite	Q	73	13	14
ca. 1118	$\alpha AB + \beta AB$ + tridymite	Q	73	15.5	11.5
ca. 1118	$\alpha AB + \beta AB + A_3B_2C$	Q	63	19	18

The region of immiscibility probably extends slightly from the CaO-SiO_2 binary system into the ternary system. The α-β inversion of $CaO.SiO_2$ takes place in the pure materials at 1200°. The lowered inversion (1118) must indicate solid solutions but these have not been investigated.

Al_2O_3-MgO-CaO (111); *v.* Fig. 47

Eutectics and quadruple points

t, °C	Solid phases	Point (Wt. %)	A, Al_2O_3	B, MgO	C, CaO
1345 ± 5	$AC + B + A_3C_5$	E	51.8	6.7	41.5
1345 ± 5	$A_3C_5 + AC_3 + B$	E	47.7	6.3	46
1680 ± 20	αA + AB(mix.) + A_5C_3	Q	74	5	21
1550 ± 5	A_5C_3 + AB(mix.) + AC	Q	63.2	3.5	33.3
1370 ± 5	AC + B + AB(mix.)	Q	52.4	6.9	40.7
1450 ± 5	$C + B + AC_3$	Q	42.5	6.0	51.5

Points on the field boundaries, Wt. %

Field 1	Field 2	A, Al_2O_3	B, MgO	C, CaO
CaO	$3CaO.Al_2O_3$	42	2	56
$5CaO.3Al_2O_3$	$CaO.Al_2O_3$	51.8	3.2	45

Owing to the chance formation of α or βAl_2O_3 the limits of the field of Al_2O_3 are not entirely definite; *see also* the one- and two-component systems involved.

SiO_2-$2MgO.SiO_2$-$CaO.Al_2O_3.2SiO_2$ (4); *v.* Fig. 48

A = SiO_2; B = $2MgO.SiO_2$; C = $CaO.Al_2O_3.2SiO_2$.

Eutectics and quadruple points

t, °C	Solid phases	Point (Wt. %)	A	B	C
1222 ± 5	$CaO.Al_2O_3.2SiO_2 + MgO.SiO_2$ + SiO_2	E	33	16.5	50.5
1260 ± 5	$CaO.Al_2O_3.2SiO_2 + MgO.SiO_2$ + $2MgO.SiO_2$	Q	19.5	25.5	55
1320 ± 5	$CaO.Al_2O_3.2SiO_2 + MgO.Al_2O_3$ + $2MgO.SiO_2$	Q*	9.5	29.5	61

* This point is unlike the other two in that a phase ($MgO.Al_2O_3$) appears which cannot be considered as part of the ternary system. The boundaries of the $MgO.Al_2O_3$ field are not true crystallization lines like the other boundaries in the system, but indicate the primary phases and the temperatures of complete melting.

Points on field boundaries, Wt. %

Field 1	Field 2	% A	% B	% C
$MgO.SiO_2$	SiO_2	37	27	36
		38	37	25
$MgO.SiO_2$	$2MgO.SiO_2$	29	54	17
		23	33	44

The silica liquidus may be discontinuous (81).

SiO_2-$2MgO.SiO_2$-$CaO.MgO.2SiO_2$ (12, 61); *v.* Fig. 49

A = SiO_2; B = $2MgO.SiO_2$; C = $CaO.MgO.2SiO_2$.

This system is one in which a complete series of solid solutions of $CaO.MgO.2SiO_2$ and $MgO.SiO_2$ occur. Most of these solutions (pyroxenes) melt incongruently though the series has a stable minimum melting point. For details (12) should be consulted. *See also* one- and two-component systems involved. The silica liquidus may be discontinuous (18, 61).

Points on curved boundaries, Wt. %

Boundary	% A	% B	% C	Boundary	% A	% B	% C
$2MgO.SiO_2$ ↓	79	15	6	SiO_2 ↓	61	18	21
Pyroxenes	60	26	14	Pyroxenes	41	31	28
	30	46	24		15	50	3[illegible]

$CaO.Al_2O_3.2SiO_2$-$CaO.MgO.2SiO_2$-$Na_2O.Al_2O_3.6SiO_2$ (13); *v.* Fig. 51

A = $CaO.Al_2O_3.2SiO_2$; B = $CaO.MgO.2SiO_2$; C = $Na_2O.Al_2O_3$.-$6SiO_2$.

Since in one binary system complete isomorphism occurs, the liquidus-solidus relations are complicated and the original should be consulted.

Points on boundary, Wt. %

% A	34	35	13
% B	46	25	20
% C	20	40	67

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(For a key to the periodicals see end of volume)

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(100) Morey and Bowen, *105*, **9**: 226; 25. (101) Morey and Bowen, *50*, **28**: 1167; 24. (102) Morey and Fenner, *1*, **39**: 1173; 17. (103) Niggli, *1*, **35**: 1693; 13. (104) Niggli, *93*, **84**: 229; 13. (105) Niggli, *93*, **98**: 241; 16. (106) Niggli, *308*, **5**: 131; 16. (107) Otin, *192*, **9**: 92; 12. (108) Parravano and Mazzetti, *22*, **30 I**: 63; 21. (109) Podszus, *92*, **30**: 17; 17.

(110) Posnjak and Merwin, *1*, **44**: 1965; 22. (111) Rankin and Merwin, *1*, **38**: 568; 16. (112) Rankin and Merwin, *12*, **45**: 301; 18. (113) Rankin and Wright, *12*, **39**: 1; 15. (114) Rice, *38*, **6**: 525; 23. (115) Roberts, *2*, **23**: 386; 24. (116) Ruer, *93*, **50**: 265; 06. (117) Ruer and Nakamoto, *70*, **42**: 675; 23. (118) Ruff and Goecke, *92*, **24**: 1459; 11. (119) Ruff and Jellinek, *93*, **97**: 312; 16.

(120) Ruff and Lauschke, *93*, **97**: 73; 16. (121) Ruff and Schmidt, *93*, **117**: 172; 21. (122) Ruff, Sieferheld and Suda, *93*, **82**: 373; 13. (123) Saunders, *78*, **21**: 425; 12. (124) Schlaepfer and Niggli, *93*, **87**: 52; 14. (125) Schumacher, *1*, **48**: 396; 26. (126) Schwarz and Haacke, *93*, **115**: 87; 21. (127) Schenk, *77*, **43**: 153; 23. (128) Shepherd, Rankin and Wright, *12*, **28**: 293; 09. (129) Shepherd, Rankin and Wright, *45*, **3**: 211; 11.

(130) Slade and Higson, *135*, **108**: 166; 13. (131) Slade and Higson, *4*, **115**: 215; 19. (132) Smits and Bijvoet, *64P*, **21**: 386; 18. (133) Smolensky, *93*, **73**: 293; 12. (134) Smyth and Roberts, *1*, **42**: 2582; 20. (135) Sosman, *45*, **8**: 985; 16. (136) Sosman, *128*, **7**: 55; 17. (137) Sosman and Hostetter, *1*, **38**: 807; 16. (138) Sosman, Hostetter and Merwin, *128*, **5**: 563; 15. (139) Sosman and Merwin, *128*, **6**: 532; 16.

(140) Sosman and Posnjak, *128*, **15**: 329; 25. (141) Stein, *93*, **55**: 159; 07. (142) Tiede and Birnbrauer, *93*, **87**: 129; 14. (143) Tucker and Lampen, *1*, **28**: 853; 06. (144) Walden, *1*, **30**: 1350; 08. (145) Wallace, *93*, **63**: 1; 09. (146) Washburn and Libman, *38*, **3**: 634; 20. (147) Watts, *81*, **19**: 453; 17. (148) Weiller, *136*, **35**: 1063; 11. (149) Weiss and Foex, *149*, **31**: 5, 89; 11.

(150) White, *12*, **47**: 1; 19. (151) Whiteley and Hallimond, *115*, **108**: 528; 19. (152) Wietzel, *93*, **116**: 71; 21. (153) Wöhler and Balz, *9*, **27**: 406; 21. (154) Wöhler and Günther, *9*, **29**: 276; 23. (155) Wologdine, *34*, **148**: 776; 09. (156) Wright and Larsen, *12*, **27**: 421; 09. (157) Bunting, U. S. Bureau of Standards, Washington, D. C., *O*.

FREEZING-POINT—SOLUBILITY DATA FOR SYSTEMS CONTAINING ORGANIC COMPOUNDS ONLY

F. SPENCER MORTIMER*

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Abbreviations and symbols.—For most of these, *v.* p. 4. The following additional ones should be noted:

- Trp. Triple point.
- Crit. Temperature of complete miscibility of two liquid phases.
- d When following a temperature datum indicates "decomposition."
- m,s (*e.g.* in A_m, B_s, etc.) are used to distinguish metastable from stable forms.

Abréviations et symboles.—Pour la plupart de ceux-ci, *v.* p. 4. On notera en plus les suivants:

- Trp. Point triple.
- Crit. Température de miscibilité complète de deux phases liquides.
- d Lorsqu'il suit une température, indique "décomposition."
- m,s (par. ex. dans A_m, B_s, etc.) sont utilisés pour distinguer la forme métastable de la forme stable.

Abkürzungen und Zeichen.—Der grösste Teil davon ist S. 4 zu finden. Ergänzend werden noch angeführt:

- Trp. Tripl-Punkt.
- Crit. Temperatur vollständiger Mischbarkeit zweier flüssiger Phasen.
- d Einer Temperaturangabe folgend, bedeutet dies "Zersetzung."
- m,s (*e.g.* in A_m, B_s, u.s.w.) werden zur Unterscheidung der metastabilen Formen von den stabilen verwendet.

Abbreviazioni e simboli.—Per la maggior parte di essi, *vedi* p. 4. Inoltre:

- Trp. Punto triplo.
- Crit. Temperatura di miscibilità completa delle due fasi liquide.
- d Quando seque i dati di temperatura indica "scomposizione."
- m,s (es. in A_m, B_s, ecc.) vengono usati per distinguere le forme stabili da quelle metastabili.

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* Avec remerciements à Dr. H. L. Ward pour l'évaluation critique des données pour certains systèmes binaires et à Mr. Ned Guthrie pour la copie et la lecture des épreuves.

* Herrn H. L. Ward für die kritische Verwertung von Daten einiger bestimmter binärer Systeme und Herrn Ned Guthrie für die Niederschrift und Korrektur ist schuldiger Dank auszusprechen.

* I dati di alcuni sistemi binari sono stati vagliati dal Dott. H. L. Ward, e Mr. Ned Guthrie li ha scritto e corretto le bozze.

† Continuous series of mixed crystals with a minimum at the temperature and the composition given.

† Séries continues de cristaux mixtes avec un minimum à la température et pour la composition données.

† Vollständige Folge von Mischkristallen mit einem Minimum bei der angegebenen Temperatur und Zusammensetzung.

† Serie continua di cristalli misti con un minimo alla temperatura e alla composizione indicate.

Arrangement.—The $\mathfrak{C}$-arrangement (*v.* Vol. III, p. viii) is followed throughout, and the systems are numbered serially. For convenience in locating all the systems in which a given component occurs, cross-references are given by means of the serial numbers. The reference expression "*v. also* p. ——" refers to the equations on p. 172.

Arrangement.—L'arrangement $\mathfrak{C}$ (*v.* Vol. III, p. viii) est utilisé partout, et les systèmes sont numérotés en série. Pour faciliter la détermination de la place de tous les systèmes dans lesquels se trouve un composé donné, les renvois sont donnés au moyen des numéros des séries. L'expression de référence "*v. also* p. ——" renvoie aux équations de la p. 172.

Anordnung.—Die $\mathfrak{C}$-Anordnung (Bd. III, S. viii) ist durchwegs verwendet. Die Systeme sind nach Serien numeriert. Zur bequemen Auffindung all der Systeme in welcher eine gegebene Komponente sich vorfindet, werden Hinweise durch die Serienzahlen angeführt. Die Bezeichnung im Hinweise "*v. also* p. ——" bezieht sich auf die Seite 172 befindliche Gleichung.

Disposizione.—L'ordinamento adottato è sempre quello $\mathfrak{C}$, e i sistemi sono numerati in serie (*vedi* Vol. III, p. viii). Per comodità, per indicare tutti i sistemi con un dato componente, il riferimento è fatto a mezzo dei numeri della serie. L'espressione "*v. also* p. ——" si riferisce all'equazione a p. 172.

PART I

TWO-COMPONENT SYSTEMS

CCl_4

1. (207.5)
B = $CHCl_3$

°C	Wt. % A
A	
−23.4	100
−43.5	90
−54.5	80
−63.7	70
−72.4	60
−81.0	50
A + B	
−81.4E	49.4
B	
−78.6	40
−75.0	30
−71.2	20
−67.5	10
−63.7	0

4. (477)
B = $C_4H_4O_4$
Fumaric acid

°C	g B per 100 g A
25.0	0.027

5. (477)
B = $C_4H_4O_4$
Maleic acid

25.0	0.002

6. (79)
B = $C_4H_8Cl_2S$
β, β-Dichlorodiethyl sulfide

°C	Wt. % A
13.9	0
10.5	10
7.2	20
3.8	30
0.5	40

7. *v.* p. 172
B = $C_6H_4Br_2$
p-Dibromobenzene

7.1. (17)
B = C_6H_6

°C	Mol % A
A	
−24.2	100
−30.0	95
−35.4	90
−44.8	80
A + AB	
−47.0E	72
AB	
−40.8	70
−35.3	60
AB + B	
−34.0U	52
B	
−32.3	50
−24.0	40
−15.9	30
− 8.5	20
− 1.5	10
+ 5.5	0

8. (443)
B = $C_7H_5N_5O_8$
Trinitrophenylmethylnitroamine (Tetryl)

°C	g B per 100 g A
0	0.007
10	0.015
20	0.025
30	0.039
40	0.058
50	0.095
60	0.154
70	0.241

9. *v.* p. 172
B = $C_7H_6O_2$
Benzoic acid

10.
B = $C_8H_{10}N_4O_2$
Caffeine
v. Seidell, p. 186

11. *v.* p. 172
B = $C_{10}H_8$
Naphthalene

11.1. (71.1)
B = $C_{10}H_{14}O$
Thymol

°C	g B per 100 g A
0.0	32.0
25.0	96.3
38.5	376.0

12. *v.* p. 172
B = $C_{12}H_9N$
Carbazole

13. *v.* p. 172
B = $C_{12}H_{10}$
Acenaphthene

14. *v.* p. 172
B = $C_{13}H_{10}$
Fluorene

15. *v.* p. 172
B = $C_{14}H_{10}$
Anthracene

16. *v.* p. 172
B = $C_{14}H_{10}$
Phenanthrene

CO_2

17. B = CH_4O
See Fig. 18, p. 213

18. (447.1)
B = C_2H_5Cl

°C	Mol % A
−78.95	32.2 (satd. soln.)
	99.70 (satd. vapor)

19. B = C_2H_6O
Methyl ether
See Fig. 19, p. 213

20. (49)
B = $C_4H_{10}O$
Ethyl ether

°C	Mol % A
−78.62	47.4
−83.5	45.4
−92.5	36.6
−98.0	30.6

99.935 % in the satd. vapor

CS_2

21. (385)
B = $C_2H_4O_2$
Acetic acid

16.7	0
12.2	10
9.6	20
8.6	30
8.0	40
7.9	50

22. *v.* p. 172
B = $C_6H_4Br_2$
p-Dibromobenzene

23. (430)
B = $C_6H_5NO_2$

°C	Wt. % B
5.22	100
3.85	98
2.62	96
1.53	94
+0.54	92
−0.46	90

24. (385)
B = C_6H_6

°C	Mol % A
+ 5.5	0
− 1.0	10
− 7.2	20
−14.1	30
−21.1	40
−28.5	50
−36.5	60
−46.1	70
−58.4	80
−72.7	90

25. (443)
B = $C_7H_5N_5O_8$
Trinitrophenylmethylnitroamine (Tetryl)

°C	g B per 100 g A
0	0.0090
10	0.0146
20	0.0208
30	0.0296
40	0.0557

26.
B = $C_8H_4O_3$
Phthalic anhydride
v. Seidell, p. 491

27. (2, 112)
B = $C_{10}H_8$
Naphthalene

°C	Mol % B
0.0	13.0
10.0	18.3
20.0	25.2
30.0	33.8
40.0	44.1
50.0	54.4
60.0	69.3
70.0	84.5
80.1	100.0

28. *v.* p. 172
B = $C_{12}H_9N$
Carbazole

29. *v.* p. 172
B = $C_{12}H_{10}$
Acenaphthene

30. *v.* p. 172
B = $C_{14}H_{10}$
Anthracene

31. *v.* p. 172
B = $C_{14}H_{10}$
Phenanthrene

32.
B = $C_{19}H_{16}$
Triphenylmethane
v. Seidell, p. 434

$CHBr_3$

33. *v.* p. 172
B = C_6H_6

34. *v.* p. 172
B = C_7H_8
Toluene

$CHCl_3$

35. (207.5)
B = CH_2Cl_2
Methylene chloride

°C	Wt. % A
A	
− 63.7	100
− 68.5	90
− 73.8	80
− 79.5	70
− 85.5	60
− 92.4	50
−100.0	40
−108.0	30
A + B	
−108.4E	29.5
B	
−105.0	20
−101.7	10
− 98.3	0

36. (207.5)
B = C_2HCl_3
Trichloroethylene

A	
− 63.7	100
− 68.0	90
− 72.2	80
− 76.5	70
− 81.3	60
− 87.2	50
− 93.8	40

36.—(*Continued*)

°C	Wt. % A
A + B	
−100.2E	31.2
B	
− 99.8	30
− 95.6	20
− 91.5	10
− 87.6	0

37. [436]
B = $C_2H_3Cl_3O_2$
Chloral hydrate

°C	Mol % A
51.5	0
45.0	10
39.5	20
36.0	30
34.0	40
32.0	50
30.0	60
27.5	70
24.0	80
17.0	90

39. *v.* p. 172
B = $C_3H_7NO_2$
Urethane

40. [477]
B = $C_4H_4O_4$
Fumaric acid

°C	g B per 100 g A
25.0	0.02

41. [477]
B = $C_4H_4O_4$
Maleic acid

25.0	0.011

42. [433]
B = $C_4H_{10}O$
Ethyl ether

°C	Mol % A
A	
− 66.5	100
A + A_2B	
− 95.0E	70
A_2B	
− 93.3	**66**
A_2B + AB	
− 97.4E	59.5
AB	
− 94.4	**50**
AB + AB_2	
−113.8U	28
AB_2 + B	
−121.7E	15
B	
−116.4	0

43.
B = $C_6H_4N_2O_4$
m-Dinitrobenzene
v. Seidell, p. 131

44. [482]
B = C_6H_6

°C	Mol % A
A	
−63.5	100
−68.5	90
−76.5	80
A + B	
−80.0E	76
B	
−69.5	70
−53.0	60
−38.5	50
−27.0	40
−17.5	30
− 9.5	20
− 1.7	10
+ 5.0	0

45. *v.* p. 172
B = C_6H_7N
Aniline

46.
B = $C_7H_5NO_4$
o-Nitrobenzoic acid
v. Seidell, p. 141

47.
B = $C_7H_5NO_4$
m-Nitrobenzoic acid
v. Seidell, p. 141

48.
B = $C_7H_5NO_4$
p-Nitrobenzoic acid
v. Seidell, p. 141

49. [443]
B = $C_7H_5N_5O_8$
Trinitrophenyl-methylnitroamine (Tetryl)

°C	g B per 100 g A
0	0.28
10	0.39
20	0.57
30	0.79
40	1.20
50	1.78
60	2.65

50.
B = $C_8H_{10}N_4O_2$
Caffeine
v. Seidell, p. 186

51. *v.* p. 172
B = $C_{10}H_8$
Naphthalene

51.1. [475]
B = $C_{10}H_9N$
α-Naphthylamine

°C	Mol % A
−11.0	70
+ 5.0	60
14.0	50
21.8	40
28.8	30
35.6	20

51.1.—(*Continued*)

°C	Mol % A
42.0	10
45.5	5
49.4	0

51.2. [71.1]
B = $C_{10}H_{16}O$
Camphor

°C	g B per 100 g A
0.4	200.0
25.0	220.0
59.2	289.0

52. *v.* p. 172
B = $C_{12}H_{10}$
Acenaphthene

53. *v.* p. 172
B = $C_{14}H_8O_2$
Anthraquinone

54. *v.* p. 172
B = $C_{14}H_{10}$
Phenanthrene
v. also 1

CH_2Cl_2
Methylene chloride
v. 35

CH_2N_2
Cyanamide

55. [391]
B = CH_4N_2O
Urea

°C	Wt. % A
A	
42.9	100
38.5	90
32.5	80
24.2	70
A + B	
17.4E	63.9
B	
32.5	60
54.7	50
73.0	40
89.5	30
132.0	0

56. [391]
B = $C_2H_4N_4$
Dicyandiamide

A	
42.9	100
40.7	95
38.5	90
37.5	85
A + B	
35.6E	85
B	
67.0	80
85.0	75
205.0	0

CH_2O_2
Formic acid

57. [111]
B = CH_3NO
Formamide

°C	Mol % A
A	
7.77	100
+ 0.2	90
− 9.7	80
A + AB	
−16.8E	75
AB	
−10.7	70
− 2.0	60
+ 1.1	**50**
− 1.0	40
− 9.3	30
AB + B	
−18.3E	23.25
B	
−14.8	20
− 5.2	10
+ 2.05	0

58. [41]
B = CH_5NO_2
Ammonium formate

°C	Mol % B
A	
8.47	0.0
7.0	1.53
4.5	3.70
+ 0.6	6.28
− 2.8	8.19
− 6.9	10.14
−12.6	12.43
−19.8	14.86
−26.9	17.11
A + A_3B	
−33.8E	18.95
A_3B	
−31.3	20.43
−30.0	21.73
A_3B + *α*-AB	
−29.5U	23.0
α-AB (Needles)	
−13.7	26.64
− 8.7	27.90
+ 0.7	30.11
10.4	33.25
17.3	36.29
22.2	39.30
24.9	41.90
25.8	42.94
α-AB + B	
29.3U	46
B	
37.5	47.87
53.1	51.88
74.3	59.98
89.5	68.23
96.5	74.32
98.5	76.20
103.7	83.46
108.5	88.41
111.7	91.64
117.3	100.0

58.—(*Continued*)

°C	Mol % B
A_3B	
−29.3m	23.33
A_3B + *β*-AB	
−29.0Um	24
β-AB (Prisms)	
−32.5m	23.33
−26.0m	24.80
−23.5m	25.41
−18.7m	26.64
−14.0m	27.90
+ 1.3m	33.25
7.4m	36.29
11.3m	39.30
13.8m	41.90
15.0m	44.38
β-AB + B	
14.3mU	43
B	
20.4m	44.38

59. [20]
B = $C_2H_4O_2$
Acetic acid

°C	Mol % A
A	
8.4	100
+ 2.8	90
− 2.9	80
− 9.3	70
−16.6	60
A + B	
−22.5E	53.5
B	
−19.5	50
−11.0	40
− 3.1	30
+ 4.0	20
10.7	10
16.7	0

60. [56]
B = $C_6H_4ClNO_2$
o-Chloronitro-benzene

A	
7.1	100
A + B	
5.5E	97
B	
32.1	0

61. [208]
B = $C_7H_8O_2$
Dimethylpyrone

A	
8.5	100
+ 3.8	95
− 2.5	80
A + A_2B	
− 6.0E	87
A_2B	
− 1.4	85
+ 8.6	80
15.2	75
18.4	70
19	**66**

61.—(*Continued*)

°C	Mol % A
A_2B	
18.8	65
A_2B + A_3B_2	
18.5E	64
A_3B_2	
19.6	**60**
A_3B_2 + B	
19.0E	57
B	
29.5	55
54.3	50
72.2	45
85.8	40
96.0	35
104.3	30
111.2	25
117.0	20
126.0	10
132.1	0

CH_3Cl

62. [24]
B = CH_4O

°C	Mol % A
A	
−93	100
A + B	
−112.0E	24.2
B	
−94	0

63. [23]
B = C_2H_6O
Methyl ether

A	
− 94.5	100
A + B	
−154E	27.0
B	
−138.5	0

CH_3NO
Formamide

64. [111]
B = $C_2H_4O_2$
Acetic acid

A	
+ 2.05	100
− 4.9	90
−14.8	80
−26.2	70
A + AB_2	
−29.5E	67.5
AB_2	
−21.2	60
−12.9	50
− 8.7	40
− 8.1	**33**
AB_2 + B	
− 8.2E	32
B	
− 6.4	30
+ 2.9	20
10.4	10
16.6	0

CH_3NO.—(*Continued*)

65. [111]
B = $C_3H_6O_2$
Propionic acid

°C	Mol % A
A	
+ 2.07	100
− 4.4	90
−12.6	80
A + A_2B	
−17.3E	75
A_2B	
−12.2	70
−11.6	**66**
−12.8	60
A_2B + AB	
−21.8E	50
AB	
−21.8	**50**
−29.0	40
AB + B	
−39.5E	36
B	
−35.0	30
−28.9	20
−24.6	10
−20.71	0

66. [111]
B = $C_4H_8O_2$
n-Butyric acid

°C	Mol % A
A	
+ 2.05	100
− 3.7	90
−10.1	80
A + A_2B	
−14.3E	74
A_2B	
−12.8	70
−12.2	**66.6**
−13.2	60
−21.5	50
A_2B + AB	
−24.5U	48.5
AB + B	
−24.9E	43.0
B	
−22.7	40
−16.9	30
−12.3	20
− 8.3	10
− 4.67	0

v. also 57

CH_4N_2O

Urea

67. B = CH_4O
v. Seidell, p. 737

68. B = C_2H_6O
Ethyl alcohol
v. Seidell, p. 737

69. B = C_3H_8O
Propyl alcohol
v. Seidell, p. 737

70. B = C_3H_8O
Isopropyl alcohol
v. Seidell, p. 737

71. B = $C_4H_{10}O$
Isobutyl alcohol
v. Seidell, p. 737

72. B = $C_5H_{12}O$
Isoamyl alcohol
v. Seidell, p. 737

73. [256]
B = $C_6H_4N_2O_4$
o-Dinitrobenzene

°C	Wt. % A
A	
131.5	100
129.5	98.5
immiscible liquids	to
129.5	1.0
A + B	
114.1E	0.5
B	
114.8	0

74. [256]
B = $C_6H_4N_2O_4$
m-Dinitrobenzene

°C	Wt. % A
A	
131.5	100
129.0	98
immiscible liquids	to
129.0	2
A + B	
88.8E	0.2
B	
89	0

75. [256]
B = $C_6H_4N_2O_4$
p-Dinitrobenzene

°C	Wt. % A
A	
131.5	100
A + B	
125.0	95
164.0	91
immiscible liquids	to
164.0	3
B	
169.5	0

76. [259, 381]
B = C_6H_6O
Phenol

°C	Mol % A
A	
131.5	100
125.2	90
118.8	80
111.5	70
102.4	60

76.—(*Continued*)

°C	Mol % A
A	
90.0	50
74.0	40
A + AB_2	
60.6E	33.4
AB_2	
60.6	**33.4**
60.4	30
55.3	20
49.8	15
42.0	10
AB_2 + B	
35E	6.5
B	
36.3	5
40.5	0

77. [256]
B = $C_7H_6N_2O_4$
2, 4-Dinitrotoluene

°C	Wt. % A
A	
131.3	100
130.0	99
immiscible liquids	to
130.0	1.0
A + B	
69.4E	0.1
B	
69.5	0

78. [226]
B = C_7H_8O
o-Cresol

°C	Mol % A
A	
131.5	100
127.3	90
124.4	80
121.1	70
116.2	60
108.4	50
95.0	40
69.0	30
A + AB	
60U	27.8
AB	
52.5	20
43.0	15
28.5	10
AB + B	
25E	9
B	
27.7	5
31.0	0

79. [226]
B = C_7H_8O
m-Cresol

°C	Mol % A
A	
131.5	100
126.6	90
123.8	80
120.5	70
116.2	60

79.—(*Continued*)

°C	Mol % A
A	
108.0	50
92.5	40
69.0	30
A + AB	
66.0U	29
AB	
56.7	20
47.0	15
33.0	10
AB + B	
ca. 2.5E	*ca.* 2
B	
4	0

80. [226]
B = C_7H_8O
p-Cresol

°C	Mol % A
A	
131.5	100
126.5	90
122.6	80
118.8	70
114.3	60
108.0	50
93.0	40
66.5	30
A + AB	
25.5U	21
AB	
25.2	20
AB + B	
20.5E	16
B	
21.5	15
26.5	10
31.0	5
34.5	0

81.
B = $C_8H_{18}O$
Octyl alcohol
v. Seidell, p. 737

v. also 55

CH_4N_2S

Ammonium thiocyanate

81.5.
B = CH_4N_2S
Thiourea
See Fig. 20, p. 213.

CH_4O

82. [385]
B = $C_2H_4O_2$
Acetic acid

°C	Mol % A
16.7	0
11.0	10
+ 4.6	20
− 3.0	30
−12.7	40
−24.7	50
−39.2	60
−63.2	70

83. [28]
B = $C_3H_6O_2$
Propionic acid

°C	Mol % A
A	
−94.5	100
A + B	
−97.7E	96
B	
−19.5	0

84. [28]
B = $C_3H_7ClO_2$
Propionic acid hydrochloride

°C	Mol % A
A	
− 94.8	100
A + AB	
−105.0E	*ca.* 95
AB	
− 36	**50**
AB + B	
− 46E	*ca.* 36.0
B	
− 40 *ca.*	0

v. also Fig. 21, p. 213

85. *v.* p. 172
B = $C_3H_7NO_2$
Urethane

86.
B = $C_5H_{11}NO_2$
Betaine
v. Seidell, p. 149

87. [385]
B = C_6H_6

°C	Mol % A
5.5	0
3.8	10
2.4	20
1.5	30
0.9	40
+ 0.1	50
− 1.55	60
− 4.9	70
−11.7	80
−30.7	90
−40.8	92.5
−53.5	95
−70.0	97.5

88.
B = $C_7H_5NO_4$
o-Nitrobenzoic acid
v. Seidell, p. 141, 143

89.
B = $C_7H_5NO_4$
m-Nitrobenzoic acid
v. Seidell, p. 141, 143

90.
B = $C_7H_5NO_4$
p-Nitrobenzoic acid
v. Seidell, p. 141, 144

91. B = $C_7H_6O_2$
Benzoic acid
v. Seidell, p. 135

92. B = $C_7H_6O_3$
Salicylic acid
v. Seidell, p. 591

93. B = $C_8H_6O_4$
o-Phthalic acid
v. Seidell, p. 490

94. B = $C_8H_8O_2$
Phenylacetic acid
v. Seidell, p. 12

95. B = $C_8H_8O_3$
dl-Mandelic acid
v. Seidell, p. 399

96. *v.* p. 173
B = C_8H_9NO
Acetanilide

97.
B = $C_9H_{10}O_2$
Hydrocinnamic acid
v. Seidell, p. 570

98. [436, 452, 475]
B = $C_{10}H_8$
Naphthalene

°C	Mol % B
0.0	0.9
10.0	1.4
20.0	2.0
30.0	2.8
40.0	4.3
50.0	7.0
60.0	13.0

98.1. [475]
B = $C_{10}H_9N$
β-Naphthylamine

°C	Mol % A
10.0	97.5
42.0	95
58.5	90
71.0	80
77.4	70
82.2	60
87.5	50
92.0	40
110.6	0

99.
B = $C_{10}H_{16}O_4$
Camphoric acid
v. Seidell, p. 225

100. [436]
B = $C_{12}H_{10}$
Acenaphthene

°C	Mol % B
0.0	0.26
10.0	0.35
20.0	0.49
30.0	0.71
40.0	1.07
50.0	1.74

101. B = $C_{12}H_{10}N_2$
Azobenzene
v. Seidell, p. 103

102. B = $C_{12}H_{24}O_2$
Lauric acid
v. Seidell, p. 349

103. (345) B = $C_{13}H_{10}$
Fluorene

°C	Mol % B
10.0	0.27
20.0	0.35
30.0	0.46
40.0	0.58
50.0	0.74
60.0	1.10

104. B = $C_{13}H_{10}O$
Benzophenone
v. Seidell, p. 146

105. *v.* p. 173
B = $C_{14}H_8O_2$
Anthraquinone

106. *v.* p. 173
B = $C_{14}H_{10}$
Anthracene

107. (153, 475) B = $C_{14}H_{10}$
Phenanthrene

°C	g B per 100 g A
20.0	2.3
30.0	3.3
40.0	5.0
50.0	7.5
60.0	10.9

108 B = $C_{14}H_{28}O_2$
Myristic acid
v. Seidell, p. 443

109. B = $C_{16}H_{32}O_2$
Palmitic acid
v. Seidell, p. 474

v. also 17, 62, 67

CH_5ClO
Methyl alcohol hydrochloride

110. (28) B = $C_3H_6O_2$
Propionic acid

°C	Mol % A
A	
−65.2	100
A + AB_2	
−72E	*ca.* 80
B	
−19.7	0

CH_5NO_2
Ammonium formate
v. 58

C_2Cl_6
Hexachloroethane

111. (362) B = $C_{10}H_8$
Naphthalene

°C	Wt. % A
αA	
187.0	100
αA + βA	
125.0U	78.0
βA + γA	
71.6U	61.0
γA + B	
56.5E	52.5
B	
80.0	0

112. (362) B = $C_{14}H_{10}$
Phenanthrene

°C	Wt. % A
αA	
187.0	100
αA + βA	
125.0U	82.0
βA + γA	
71.6U	55.0
γA + B	
65.6E	48.0
B	
99.0	0

C_2HCl_3
Trichloroethylene

113. B = $C_7H_6O_2$
Benzoic acid
v. Seidell, p. 136

v. also 36

C_2HCl_3O
Chloral

114. (299) B = C_2H_6O
Ethyl alcohol

°C	Mol % A
A	
− 57.5	100
A + AB	
− 55.5E	98.5
AB	
46.6	**50**
AB + B	
?E	?
B	
−130.5	0

$C_2HCl_3O_2$
Trichloroacetic acid

115. (209) B = $C_2H_2Cl_2O_2$
Dichloroacetic acid

°C	Mol % A
A	
57.3	100
50.8	90
47.2	85
43.3	80
39.2	75
34.8	70
29.2	65
23.2	60
16.6	55
9.4	50
+ 2.2	45
− 5.2	40
A + B	
−11.0E	36.0
B	
− 6.9	30
− 0.4	20
+ 5.2	10
9.7	0

116. (209) B = $C_2H_3ClO_2$
Chloroacetic acid

°C	Mol % A
A	
57.3	100
50.7	90
46.9	85
43.0	80
39.0	75
34.8	70
30.3	65
25.7	60
20.9	55
A + B	
17.5E	51.5
B	
20.1	50
26.9	45
33.0	40
42.8	30
50.3	20
56.6	10
61.4	0

117. (209) B = $C_2H_4O_2$
Acetic acid

°C	Mol % A
57.3	100
49.6	90
45.2	85
40.4	80
35.0	75
28.7	70
21.5	65
12.7	60
+ 2.5	55
−10.5	50
−27.0	45
?	40
−22.7	30
− 3.2	20
+ 8.7	10
16.4	0

118. (209) B = $C_4H_6O_2$
Crotonic acid

°C	Mol % A
A	
57.3	100
49.7	90
45.2	85
39.5	80
32.7	75
25.0	70
15.6	65
+ 3.0	60
−12.0	55
A + B	
−19E	*ca.* 53
B	
− 9.5	50
+ 4.3	45
16.1	40
35.2	30
50.3	20
62.5	10
71.0	0

119. (212) B = $C_4H_6O_4$
Dimethyl oxalate

°C	Mol % A
A	
58.0	100
49.4	90
37.9	80
30.6	75
22.5	70
13.3	65
+ 2.5	60
A + B	
− 3.5E	*ca.* 57.5
B	
+ 1.7	55
10.4	50
17.8	45
24.1	40
29.7	35
34.5	30
38.7	25
42.5	20
45.8	15
48.7	10
51.2	5
53.3	0

120. (212) B = $C_4H_8O_2$
Ethyl acetate

°C	Mol % A
A	
58.0	100
50.4	90
38.8	80
30.0	75
18.3	70
+ 2.5	65
−18.2	60
A + AB	
−30E	58
AB	
−29.2	55
−27.5	**50**
−29.5	45
−32.6	40
−36.7	35
−41.5	30
−47.5	25
−55.8	20
−66.0	15
−78.2	10
AB + B	
−90E	6
B	
−89.1	5
−83.0	0

121. (212) B = $C_5H_8O_4$
Dimethyl malonate

°C	Mol % A
A	
58.0	100
48.0	90
30.7	80
19.0	75
+ 4.1	70
−15.0	65
A + A_2B	
−30.0U	60
A_2B	
−33.4	55
−39.0	50
−47.2	45
−58.0	40
B	
−62.0	0

123. (213) B = $C_6H_4O_2$
Benzoquinone

°C	Mol % A
A	
58.0	100
50.7	90
38.7	80
30.5	75
20.9	70
9.9	65
A + B	
1.0E	*ca.* 61.5
B	
6.1	60
24.6	55
40.2	50
52.8	45
63.6	40
72.8	35
81.3	30
88.8	25
95.5	20
101.3	15
106.3	10
114.6	0

124. (210) B = $C_6H_5NO_3$
o-Nitrophenol

°C	Mol % A
A	
58.0	100
51.3	90
43.8	80
39.8	75
35.5	70
30.9	65
26.3	60
21.4	55
A + B	
16.8E	50
B	
20.2	45
23.5	40
26.7	35
29.7	30
32.5	25
35.3	20
37.8	15
40.3	10
42.6	5
44.7	0

125. (210) B = $C_6H_5NO_3$
m-Nitrophenol

°C	Mol % A
A	
58.0	100
51.8	90
45.7	80
42.8	75
A + B	
41.5E	*ca.* 73
B	
44.8	70
49.9	65
54.7	60
59.3	55
63.6	50
67.5	45
71.3	40
74.8	35
78.2	30
81.3	25
84.5	20
87.3	15
90.1	10
92.7	5
95.3	0

126. (210) B = $C_6H_5NO_3$
p-Nitrophenol

°C	Mol % A
A	
58.0	100
52.6	90
46.7	80
A + B	
44.0E	*ca.* 76
B	
45.5	75
51.6	70
57.6	65
63.6	60
69.5	55
75.0	50

$C_2HCl_3O_2$.—(*Continued*)

126.—(*Continued*)

°C	Mol % A
B	
80.1	45
84.7	40
89.0	35
93.0	30
96.8	25
100.4	20
104.3	15
107.7	10
110.8	5
113.8	0

127. (212)
B = C_6H_6

°C	Mol % A
A	
58.0	100
51.3	90
44.4	80
40.7	75
36.9	70
33.0	65
29.1	60
24.9	55
20.6	50
16.3	45
11.8	40
7.2	35
+2.5	30
−2.5	25
A + B	
−4.0E	23.5
B	
−2.4	20
−0.4	15
+1.7	10
3.7	5
5.4	0

128. (210)
B = C_6H_6O
Phenol

°C	Mol % A
A	
58.0	100
51.1	90
42.8	80
38.2	75
33.4	70
A + AB	
32.0E	68.5
AB	
34.0	65
35.8	60
37.2	55
37.6	**50**
37.2	45
35.8	40
33.8	35
31.2	30
28.2	25
25.0	20
AB + B	
24.8E	19.7

128.—(*Continued*)

°C	Mol % A
B	
29.6	15
34.4	10
38.8	5
42.4	0

129. (212)
B = $C_6H_{10}O_4$
Dimethyl succinate

°C	Mol % A
A	
58.0	100
47.6	90
26.6	80
11.7	75
A + A_2B	
5.0E	73
A_2B	
6.8	70
8.0	**66**
7.8	65
5.7	60
+ 1.7	55
− 3.7	50
−10.5	45
A_2B + B	
−14.0E	43
B	
−10.0	40
− 4.0	35
+ 1.7	30
6.1	25
9.5	20
12.5	15
14.8	10
16.7	5
18.2	0

130. (212)
B = $C_6H_{10}O_4$
Diethyl oxalate

°C	Mol % A
A	
58.0	100
48.3	90
33.3	80
23.3	75
11.0	70
A + A_2B	
3.3E	67.2
A_2B	
3.4	**66.7**
3.3	65
+ 1.7	60
− 1.4	55
− 5.8	50
−11.7	45
−18.7	40
−27.1	35
−36.6	30
−47.2	25
A_2B + B	
−50.0E	23.5
B	
−48.0	20
−45.3	15
−43.4	10
−42.0	5
−41.0	0

131. (213)
B = $C_7H_5NO_3$
o-Nitrobenzaldehyde

°C	Mol % A
A	
58.0	100
52.5	90
44.5	80
39.7	75
33.8	70
27.6	65
20.7	60
13.3	55
A + B	
5.5E	50
B	
11.6	45
17.8	40
23.1	35
27.3	30
30.6	25
33.4	20
36.0	15
38.5	10
42.9	0

132. (213)
B = $C_7H_5NO_3$
m-Nitrobenzaldehyde

°C	Mol % A
A	
58.0	100
50.8	90
42.3	80
37.0	75
31.3	70
24.6	65
16.4	60
A + B	
11.0E	57
B	
13.1	55
18.5	50
23.0	45
29.0	40
33.6	35
38.1	30
42.2	25
45.5	20
48.3	15
51.0	10
55.7	0

133. (213)
B = $C_7H_5NO_3$
p-Nitrobenzaldehyde

°C	Mol % A
A	
58.0	100
51.2	90
41.9	80
36.8	75
31.4	70
A + B	
29.0E	67.5

133.—(*Continued*)

°C	Mol % A
B	
34.6	65
44.5	60
53.3	55
61.2	50
67.5	45
73.3	40
78.7	35
83.8	30
88.3	25
92.1	20
95.4	15
98.6	10
104.4	0

134. (213)
B = C_7H_6O
Benzaldehyde

°C	Mol % A
A	
58.0	100
50.1	90
40.2	80
32.8	75
23.5	70
8.4	65
A + AB	
1.5E	63
AB	
4.3	60
7.3	55
8.4	**50**
7.1	45
+4.4	40
−0.2	35
−6.1	30

135. (209)
B = $C_7H_6O_2$
Benzoic acid

°C	Mol % A
A	
57.3	100
49.8	90
45.4	85
40.2	80
34.6	75
28.3	70
A + AB	
26.5E	68.5
AB	
29.7	65
33.2	60
AB + B	
35.0U	56
B	
37.5	55
50.3	50
62.3	45
73.8	40
92.6	30
105.5	20
114.5	10
121.0	0

136. B = $C_7H_6O_2$ (213)
o-Hydroxybenzaldehyde

°C	Mol % A
58.0	100
50.5	90
40.2	80
33.5	75
26.0	70
16.8	65
+5.8	60
−7.0	55

137. B = $C_7H_6O_2$ (213)
m-Hydroxybenzaldehyde

°C	Mol % A
A	
58.0	100
50.4	90
40.2	80
33.8	75
27.2	70
A + B	
22.5E	66.5
B	
26.3	65
38.4	60
48.7	55
57.8	50
65.6	45
72.8	40
79.1	35
84.8	30
89.8	25
94.3	20
98.4	15
101.8	10
107.4	0

138. B = $C_7H_6O_2$ (213)
p-Hydroxybenzaldehyde

°C	Mol % A
A	
58.0	100
51.7	90
A + AB	
45.5E	83
AB	
49.3	80
55.0	75
60.0	70
63.5	65
65.9	60
67.3	55
67.8	**50**
AB + B	
67.7E	45
B	
76.3	40
83.9	35
90.7	30
96.4	25
101.8	20
106.0	15
109.6	10
115.6	0

139. (210)
B = C_7H_8O
o-Cresol

°C	Mol % A
A	
58.0	100
50.7	90
41.9	80
37.2	75
31.8	70
26.1	65
A + AB	
24.3E	63.5
AB	
25.5	60
26.6	55
27.0	**50**
26.6	45
25.3	40
23.4	35
20.7	30
17.8	25
AB + B	
16.0E	22
B	
17.6	20
21.1	15
24.5	10
27.6	5
30.4	0

140. (210)
B = C_7H_8O
m-Cresol

°C	Mol % A
A	
58.0	100
51.0	90
42.5	80
37.6	75
32.3	70
26.7	65
20.7	60
14.4	55
A + AB	
13.6E	54.5
AB	
14.5	**50**
13.9	45
12.7	40
10.7	35
7.6	30
+3.5	25
−1.5	20
AB + B	
−2.0E	18.5
B	
−0.2	15
+3.6	10
7.3	5
10.9	0

141. (210)
B = C_7H_8O
p-Cresol

°C	Mol % A
A	
58.0	100
50.8	90

141.—(*Continued*)

°C	Mol % A
A	
42.2	80
37.5	75
32.3	70
A + AB	
31.5E	69.5
AB	
33.9	65
35.8	60
37.2	55
37.6	**50**
37.1	45
35.7	40
33.3	35
30.2	30
26.2	25
21.5	20
AB + B	
19.5E	18
B	
22.2	15
26.7	10
30.9	5
34.5	0

142. (208, 386)
B = $C_7H_8O_2$
Dimethylpyrone

°C	Mol % A
A	
58.0	100
54.0	95
47.6	90
34.7	85
A + A_2B	
15.0E	81.5
A_2B	
36.5	80
53.0	75
63.6	70
66.7	**66.7**
65.9	65
57.8	60
A_2B + AB	
40.0E	55
AB	
44.8	**50**
AB + B	
41E	46
B	
49.0	45
79.2	40
96.0	35
107.8	30
115.4	25
120.7	20
124.5	15
127.3	10
132.1	0

143. (213)
B = $C_8H_5NO_5$
Nitropiperonal

°C	Mol % A
A	
58.0	100
51.5	90
42.7	80
37.7	75
32.5	70
A + B	
30.7E	68.5
B	
35.4	65
42.2	60
48.4	55
54.0	50
59.2	45
64.4	40
69.2	35
73.7	30
77.9	25
81.8	20
85.2	15
88.4	10
94.1	0

144. (213)
B = $C_8H_6O_3$
Piperonal

°C	Mol % A
A	
58.0	100
49.7	90
36.2	80
A + AB	
30.0E	77
A_2B	
32.7	75
37.1	70
37.4	**66**
37.1	65
34.0	60
A_2B + AB	
30.5E	56
AB	
31.5	55
35.0	**50**
33.6	45
30.3	40
26.6	35
22.3	30
AB + B	
18.3E	25.5
B	
18.7	25
22.6	20
26.3	15
29.8	10
35.5	0

145. (213)
B = C_8H_8O
Acetophenone

°C	Mol % A
A	
58.0	100
49.2	90
36.7	80
27.7	75
16.5	70
A + AB	
14.0E	69
AB	
17.1	65
20.8	60
23.9	55
26.0	**50**
24.5	45
21.3	40
16.5	35
10.6	30
3.7	25
AB + B	
1.5E	23.5
B	
5.0	20
9.7	15
13.4	10
18.7	0

146. (213)
B = $C_8H_8O_2$
Anisaldehyde

°C	Mol % A
A	
58.0	100
49.8	90
36.1	80
26.5	75
A + AB	
14.5E	70
AB	
20.6	65
26.1	60
29.6	55
30.9	**50**
29.3	45
26.3	40
22.0	35
16.2	30
9.5	25
+2.2	20
−6.1	15
AB + B	
−9.0E	13.5
B	
−6.8	10
−0.9	0

147. (209)
B = $C_8H_8O_2$
Phenylacetic acid

°C	Mol % A
A	
57.3	100
50.8	90
46.7	85
41.8	80
36.0	75
29.2	70
21.2	65
12.6	60
A + B	
1.5E	55
B	
14.0	50
25.1	45
34.9	40
50.5	30
61.8	20
70.3	10
76.7	0

148. (209)
B = $C_8H_8O_2$
o-Toluic acid

°C	Mol % A
A	
57.3	100
49.9	90
45.5	85
A + AB	
37.7E	77.8
AB	
41.1	75
46.0	70
49.3	65
51.3	60
52.5	55
53.0	**50**
AB + B	
52.9E	49
B	
59.3	45
67.0	40
80.0	30
90.0	20
97.6	10
103.4	0

149. (209)
B = $C_8H_8O_2$
m-Toluic acid

°C	Mol % A
A	
57.3	100
49.7	90
45.2	85
39.8	80
34.2	75
28.0	70
A + AB	
26.0E	68.5
AB	
29.6	65
33.4	60
36.0	55
AB + B	
37.3U	50.5
B	
55.0	45
65.9	40
80.9	30
91.7	20
100.7	10
107.6	0

150. (209)
B = $C_8H_8O_2$
p-Toluic acid

°C	Mol % A
A	
57.3	100
49.3	90
A + AB	
42.0E	83.5
AB	
48.3	80
54.9	75
59.9	70
AB + B	
64.5U	64
B	
84.1	60
100.8	55
115.0	50
126.3	45
137.2	40
152.3	30
164.2	20
172.8	10
178.6	0

151. (212)
B = $C_8H_8O_2$
Methyl benzoate

°C	Mol % A
A	
58.0	100
50.0	90
37.9	80
29.2	75
18.8	70
+ 7.0	65
− 5.5	60
A + AB	
−11.0E	57.7
AB	
− **8.8**	**50**
−10.2	45
−13.0	40
−17.1	35
−22.5	30
AB + B	
−29.0E	25
B	
−24.2	20
−20.2	15
−16.7	10
−14.1	5
−12.3	0

152. (213)
B = $C_8H_8O_3$
Vanillin

°C	Mol % A
A	
58.0	100
50.5	90
38.8	80
30.3	75
20.2	70
A + A_2B	
14.2E	67.3
A_2B	
14.3	**66.7**
A_2B + AB	
12.0E	62
AB	
16.1	60
21.8	55
AB + AB_2	
22.8U	51.2
AB_2	
35.1	45
41.3	40
AB_2 + B	
44.7U	35
B	
53.3	30
60.4	25
65.7	20
70.2	15
73.9	10
80.9	0

153. (212)
B = $C_8H_{14}O_4$
Diethyl succinate

°C	Mol % A
58.0	100
46.8	90
24.0	80
+ 4.5	75
−20.5	70
−43.8	40
−38.0	35
−33.4	30
−30.2	25
−27.7	20
−25.6	15
−23.8	10
−22.3	5
−20.8	0

154. (209)
B = $C_9H_8O_2$
Cinnamic acid

°C	Mol % A
A	
57.3	100
50.8	90
47.0	85
42.2	80
A + AB	
39.7E	77.7
AB	
43.7	75
50.3	70
55.3	65
58.8	60
AB + B	
63.5U	52
B	
67.9	50
77.2	45
85.8	40
100.7	30
113.7	20
125.8	10
136.8	0

155. (212)
B = $C_9H_{10}O_2$
Ethyl benzoate

°C	Mol % A
A	
58.0	100
50.3	90
38.7	80

$C_2HCl_3O_2$.—(*Continued*)

155.—(*Continued*)

°C	Mol % A
A	
30.0	75
19.6	70
+ 8.2	65
− 8.2	60
A + AB	
−24.5E	56
AB	
−23.4	**50**
−24.9	45
−27.7	40
−32.0	35
−37.4	30
AB + B	
−46.5E	27.6
B	
−43.2	25
−44.3	20
−40.5	15
−37.1	10
−34.6	5
−32.7	0

156. (212)
B = $C_9H_{10}O_2$
Methyl *p*-toluate

°C	Mol % A
A	
58.0	100
50.6	90
38.5	80
30.8	75
20.5	70
8.0	65
A + AB	
3.0E	63
AB	
8.2	55
9.0	**50**
7.5	45
AB + B	
3.5E	39
B	
9.0	35
15.4	30
20.6	25
24.7	20
27.8	15
30.2	10
31.9	5
33.2	0

157. (212)
B = $C_9H_{10}O_3$
Methyl anisate

°C	Mol % A
A	
58.0	100
49.7	90
35.5	80
26.3	75
15.8	70
+ 3.4	65
A + AB	
−10.0E	60

157.—(*Continued*)

°C	Mol % A
AB	
− 7.1	55
− 6.3	**50**
AB + B	
− 8.0E	44.5
B	
+ 5.0	40
16.0	35
23.8	30
29.9	25
35.0	20
39.3	15
42.8	10
45.8	5
48.3	0

158. (210)
B = $C_{10}H_8O$
α-Naphthol

°C	Mol % A
A	
58.0	100
51.8	90
45.0	80
A + B	
41.0E	76
B	
45.9	70
50.3	65
54.4	60
58.2	55
61.8	50
65.3	45
69.0	40
72.4	35
75.8	30
79.3	25
82.6	20
85.7	15
88.6	10
91.3	5
94.2	0

159. (210)
B = $C_{10}H_8O$
β-Naphthol

°C	Mol % A
A	
58.0	100
50.4	90
A + B	
41.3E	79
B	
48.0	75
56.5	70
64.2	65
70.6	60
77.0	55
82.3	50
87.6	45
91.9	40
97.0	35
101.1	30
105.2	25
109.2	20

159.—(*Continued*)

°C	Mol % A
B	
112.8	15
116.3	10
119.8	5
123.0	0

160. (212)
B = $C_{10}H_{10}O_2$
Methyl cinnamate

°C	Mol % A
A	
58.0	100
49.7	90
38.1	80
29.8	75
20.0	70
7.1	65
A + AB	
1.0E	63
AB	
3.6	60
6.9	55
8.5	**50**
7.0	45
AB + B	
1.0E	38
B	
6.0	35
13.7	30
19.1	25
23.5	20
27.2	15
30.2	10
32.5	5
34.7	0

161. (212)
B = $C_{10}H_{10}O_4$
Dimethyl terephthalate

°C	Mol % A
A	
58.0	100
48.2	90
A + A_4B	
27.9U	80
A_4B	
26.6	75
A_4B + B	
25.0E	72.2
B	
33.8	70
51.5	65
68.4	60
82.6	55
93.4	50
102.0	45
109.2	40
115.3	35
120.6	30
125.2	25
129.3	20
132.8	15
135.8	10
138.2	5
140.3	0

162. (210)
B = $C_{10}H_{14}O$
Thymol

°C	Mol % A
A	
58.0	100
51.2	90
42.8	80
38.2	75
33.0	70
27.3	65
21.1	60
14.8	55
A + B	
9.0E	50.5
B	
15.6	45
21.1	40
26.8	35
30.8	30
34.9	25
38.6	20
41.7	15
44.4	10
47.1	5
49.6	0

163. (212)
B = $C_{12}H_{10}O_2$
α-Naphthyl acetate

°C	Mol % A
A	
58.0	100
50.4	90
39.0	80
30.6	75
20.9	70
A + AB	
5.5E	63.5
AB	
7.7	60
9.9	55
10.7	**50**
9.8	45
AB + B	
7.8E	41.5
B	
17.8	35
24.0	30
28.4	25
32.9	20
36.8	15
39.8	10
42.4	5
44.8	0

164. (212)
B = $C_{12}H_{10}O_2$
β-Naphthyl acetate

°C	Mol % A
A	
58.0	100
50.5	90
A + AB	
39.2E	80
AB	
47.9	75
55.6	70

164.—(*Continued*)

°C	Mol % A
AB	
60.1	65
63.4	60
65.4	55
66.3	**50**
65.6	45
63.7	40
60.8	35
56.8	30
AB + B	
53.5E	26.5
B	
57.9	20
61.0	15
64.0	10
66.5	5
68.5	0

165. (213)
B = $C_{13}H_{10}O$
Benzophenone

°C	Mol % A
A	
58.0	100
50.2	90
38.2	80
29.8	75
19.3	70
+7.0	65
−6.0	60
vis.	60–43
−3.1	42.5
+2.6	40
12.4	35
20.5	30
27.3	25
32.7	20
37.2	15
40.8	10
46.3	0

166. (212)
B = $C_{13}H_{10}O_2$
Phenyl benzoate

°C	Mol % A
A	
58.0	100
50.0	90
38.5	80
31.0	75
22.0	70
11.4	65
A + B	
7.0E	63
B	
12.2	60
20.8	55
29.0	50
36.0	45
41.9	40
47.0	35
51.2	30
54.9	25
58.2	20
61.4	15
64.2	10
66.3	5
67.8	0

167. (212)
B = $C_{13}H_{13}O_3$
Phenyl salicylate

°C	Mol % A
58.0	100
50.0	90
39.2	80
7.5	50
12.4	45
17.2	40
21.6	35
25.5	30
27.9	25
32.2	20
34.9	15
37.5	10
39.9	5
41.9	0

168. (213)
B = $C_{14}H_{10}O_2$
Benzil

°C	Mol % A
A	
58.0	100
49.7	90
37.2	80
30.3	75
A + B	
18.0E	68
B	
24.7	65
34.9	60
43.9	55
51.8	50
58.6	45
64.8	40
69.8	35
74.2	30
78.2	25
81.8	20
85.2	15
88.3	10
94.0	0

169. (213)
B = $C_{14}H_{12}O_2$
Phenyl anisyl ketone

°C	Mol % A
58.0	100
48.3	90
34.0	80
23.3	75
+10.4	70
− 4.0	65
vis.	65–48
+ 1.4	47.5
8.7	45
21.3	40
31.8	35
39.2	30
44.2	25
48.5	20
51.8	15
54.3	10
58.7	0

170. (212)
B = $C_{14}H_{12}O_2$
Benzyl benzoate

°C	Mol % A
A	
58.0	100
49.6	90
38.0	80
30.6	75
21.5	70
A + AB	
8.5E	64
AB	
10.2	60
11.4	55
11.9	**50**
10.7	45
8.4	40
4.3	35
AB + B	
1.0E	32
B	
6.8	25
10.0	20
12.8	15
15.0	10
16.7	5
18.3	0

171. (213)
B = $C_{17}H_{14}O$
Dibenzalacetone

°C	Mol % A
A	
58.0	100
A + A_2B	
45.0E	90.5
A_2B	
77.2	80
82.8	75
(87.6	75)
85.7	70
(99.9	70)
AB	
107.9	65
112.7	60
115.6	55
117.0	**50**
115.0	45
111.8	40

C_2H_2
Acetylene
172. (25)
B = C_2H_6O
Methyl ether

°C	Mol % A
A	
− 81.5	100
A + AB	
−121.0E	64.5
AB	
−117.4	**50**
AB + B	
−152E	19
B	
−138	0

$C_2H_2Br_3NO$
Tribromoacetamide
173. (288)
B = $C_2H_2Cl_3NO$
Trichloroacetamide

°C	Mol % A
A	
120.55	100
Mix	
(?)	(?)
B	
139.91	0

$C_2H_2Cl_2O_2$
Dichloroacetic acid
174. (209)
B = $C_2H_3ClO_2$
Chloroacetic acid

°C	Mol % A
A	
9.7	100
7.2	95
4.2	90
+ 0.9	85
− 2.4	80
− 6.1	75
A + B	
−10.5E	69.3
B	
+ 9.8	60
24.5	50
35.2	40
43.8	30
50.8	20
56.6	10
61.4	0

175. (209)
B = $C_2H_4O_2$
Acetic acid

°C	Mol % A
9.7	100
6.5	95
+ 2.8	90
− 1.6	85
− 6.2	80
−12.1	75
−18.7	70
−34.7	60
B	
−27.8	40
−11.6	30
+ 0.3	20
9.3	10
16.4	0

176. (209)
B = $C_4H_6O_2$
Crotonic acid

°C	Mol % A
A	
9.7	100
5.7	95
+ 1.7	90
− 2.7	85
− 7.0	80
−11.9	75
A + B	
−19.0E	68

176.—(*Continued*)

°C	Mol % A
B	
−11.0	60
+10.1	50
26.7	40
40.0	30
51.9	20
62.3	10
71.0	0

177. (209)
B = $C_7H_6O_2$
Benzoic acid

°C	Mol % A
A	
9.7	100
A + AB	
7.4E	96.4
AB	
13.5	95
30.0	90
40.1	85
46.0	80
50.0	75
53.0	70
57.2	60
AB + B	
58.0U	53.6
B	
63.4	50
77.8	40
90.7	30
102.3	20
112.2	10
121.0	0

178. (208)
B = $C_7H_8O_2$
Dimethylpyrone

°C	Mol % A
A	
9.7	100
+ 4.8	95
− 1.9	90
−11.0	85
−23.8	80
(?)	75
(?)	70
AB	
− 4.5	65
+10.5	60
19.5	55
22.9	50
AB + B	
22.8E	49
B	
48.2	45
73.0	40
89.9	35
101.0	30
110.2	25
117.8	20
123.1	15
126.8	10
132.1	0

179. (209)
B = $C_8H_8O_2$
Phenylacetic acid

179.—(*Continued*)

°C	Mol % A
A	
9.7	100
5.6	95
+ 1.3	90
− 3.1	85
− 7.9	80
−13.4	75
A + B	
−21.0E	68.7
B	
+ 1.7	60
22.5	50
38.6	40
51.6	30
61.9	20
69.9	10
76.6	0

180. (209)
B = $C_8H_8O_2$
o-Toluic acid

°C	Mol % A
A	
9.7	100
5.6	95
+ 1.3	90
A + B	
− 2.0E	86
B	
+12.1	80
22.4	75
31.6	70
47.8	60
61.6	50
73.1	40
82.5	30
90.4	20
97.3	10
103.4	0

181. (209)
B = $C_8H_8O_2$
m-Toluic acid

°C	Mol % A
A	
9.7	100
5.3	95
+ 0.7	90
− 4.2	85
A + B	
− 8.0E	81
B	
+11.7	75
23.8	70
43.2	60
59.3	50
72.6	40
83.3	30
92.6	20
100.5	10
107.6	0

182. (209)
B = $C_8H_8O_2$
p-Toluic acid

°C	Mol % A
A	
9.7	100
5.2	95

182.—(*Continued*)

°C	Mol % A
A + B	
3.5E	93
B	
18.8	90
40.2	85
58.3	80
72.3	75
84.6	70
107.0	60
125.2	50
140.3	40
153.0	30
163.5	20
171.8	10
178.6	0

183. (209)
B = $C_9H_8O_2$
Cinnamic acid

°C	Mol % A
A	
9.7	100
A + AB	
8.0E	97.7
AB	
30.2	95
48.7	90
57.8	85
64.9	80
70.0	75
74.2	70
78.7	60
80.1	**50**
AB + B	
80E	49
B	
93.5	40
106.2	30
117.8	20
128.1	10
136.8	0

v. also 115

$C_2H_2Cl_3NO$
Trichloroacetamide
v. 173

$C_2H_2Cl_4$
Tetrachloroethane
184. (475)
B = $C_{12}H_9N$
Carbazole

°C	g B per 100 g A
20.0	0.65
30.0	0.92
40.0	1.25
50.0	1.62
60.0	2.12
70.0	2.80
80.0	3.6
100.0	6.2
120.0	11.1
140.0	17.1

185. *v.* p. 173
B = $C_{14}H_8O_2$
Anthraquinone

186. *v.* p. 173
B = $C_{14}H_{10}$
Anthracene

187. *v.* p. 173
B = $C_{14}H_{10}$
Phenanthrene

$C_2H_2I_2$
cis-Acetylene diiodide
188. (76)
B = $C_2H_2I_2$
trans-Acetylene diiodide

°C	Mol % A
−13.8	100
+10	84.5
33U?	60
61.5	50
72.0	0

$C_2H_3ClO_2$
α-Chloroacetic acid
189. *v.* p. 173
B = $C_2H_4O_2$
Acetic acid

190. *v.* p. 173
B = $C_4H_6O_2$
Crotonic acid

191. (212)
B = $C_4H_6O_4$
Dimethyl oxalate

°C	Mol % A
A	
61.7	100
56.2	90
49.5	80
41.7	70
32.8	60
A + B	
25.5E	52.5
B	
34.6	40
40.4	30
45.4	20
49.6	10
53.2	0

192. (212)
B = C_6H_6

°C	Mol % A
A	
61.7	100
57.7	90
53.7	80
50.0	70
46.5	60
42.9	50
39.2	40
34.7	30
27.9	20
14.1	10
A + B	
3.5E	5
B	
5.4	0

$C_2H_3ClO_2$.—(*Continued*)

193. *v.* p. 173
B = C_6H_6O
Phenol

194. (212)
B = $C_6H_{10}O_4$
Dimethyl succinate

°C	Mol % A
A	
61.7	100
54.7	90
45.3	80
34.2	70
21.3	60
+7.2	50
A + B	
−3.5E	42.8
B	
−1.5	40
+5.5	30
10.5	20
14.7	10
18.2	0

195. *v.* p. 173
B = $C_7H_6O_2$
Benzoic acid

196. *v.* p. 173
B = C_7H_8O
o-Cresol

197. *v.* p. 173
m-Cresol

198. *v.* p. 173
p-Cresol

199. (208)
B = $C_7H_8O_2$
Dimethylpyrone

A	
61.3	100
57.8	95
53.3	90
46.3	85
35.6	80
22.0	75
A + AB	
5.1E	70
AB	
22.0	65
32.0	60
37.7	55
39.9	**50**
AB + B	
39.9E	49.5
B	
62.3	45
79.9	40
92.7	35
102.7	30
110.2	25
116.7	20
121.7	15
125.8	10
132.1	0

200. (313)
B = $C_7H_8O_2$
Guaiacol

°C	Mol % A
A	
61.7	100
56.1	90
50.0	80
43.6	70
37.0	60
30.1	50
22.8	40
A + B	
13.0E	26.6
B	
17.8	20
24.9	10
32.0	0

201. (213, 315)
B = $C_8H_6O_3$
Piperonal

A	
61.86	100
55.5	90
48.5	80
39.9	70
29.8	60
18.4	50
A + B	
7.3E	40.5
B	
15.5	30
23.0	20
29.8	10
35.5	0

202. (213)
B = C_8H_8O
Acetophenone

61.7	100
54.8	90
46.0	80
36.2	70
23.4	60
+7.8	50
A + B	
−7.3E	41
B	
+0.6	30
7.4	20
13.5	10
18.7	0

203. *v.* p. 173
B = $C_8H_8O_2$
Phenylacetic acid

204. *v.* p. 173
B = $C_8H_8O_2$
o-Toluic acid

205. *v.* p. 173
B = $C_8H_8O_2$
m-Toluic acid

206. *v.* p. 173
B = $C_8H_8O_2$
p-Toluic acid

207. (213)
B = $C_8H_8O_3$
Vanillin

°C	Mol % A
A	
61.7	100
55.4	90
48.3	80
40.7	70
A + B	
30.5E	57.4
B	
41.5	50
52.9	40
61.8	30
69.2	20
75.4	10
80.9	0

208. *v.* p. 173
B = $C_9H_8O_2$
Cinnamic acid

209. (315)
B = $C_{10}H_8$
Naphthalene

°C	Mol % A
A	
61.7	100
57.0	90
53.2	80
A + B	
52.7E	75
B	
56.2	70
61.3	60
64.7	50
67.7	40
70.6	30
73.5	20
76.4	10
79.6	0

210. (313)
B = $C_{10}H_8O$
α-Naphthol

A	
61.7	100
56.9	90
51.2	80
A + B	
47.0E	73
B	
57.0	60
64.7	50
71.6	40
77.8	30
83.5	20
89.0	10
94.0	0

211. (313)
B = $C_{10}H_8O$
β-Naphthol

A	
61.7	100
55.0	90

211.—(*Continued*)

°C	Mol % A
A + B	
48.0E	80
B	
62.5	70
74.8	60
86.0	50
95.7	40
103.5	30
110.5	20
116.5	10
122.0	0

212. (212)
B = $C_{10}H_{10}O_2$
Methyl cinnamate

A	
61.7	100
55.5	90
47.8	80
39.5	70
30.5	60
20.9	50
A + B	
11.4E	40.7
B	
18.6	30
24.8	20
30.1	10
34.4	0

213. (313)
B = $C_{10}H_{14}O$
Thymol

A	
61.7	100
57.2	90
52.9	80
48.5	70
43.5	60
37.9	50
A + B	
30.1E	39
B	
36.0	30
41.5	20
46.0	10
50.0	0

214. (379)
B = $C_{10}H_{16}O$
Camphor

A	
63	100
46.2	96.71
41	88.12
33	81.01
23.1	70.57
B	
40	34.87
75	28.63
106	22.03
175	0.00

215. *v.* p. 173
B = $C_{13}H_{10}O_3$
Salol

216. (213)
B = $C_{14}H_{10}O_2$
Benzil

°C	Mol % A
A	
61.7	100
56.6	90
A + B	
50.0E	77.5
B	
56.1	70
63.8	60
70.2	50
75.9	40
80.9	30
85.6	20
89.9	10
94.0	0

217. (315)
B = $C_{16}H_{34}O$
Cetyl alcohol

A	
61.7	100
56.6	90
51.5	80
45.3	70
35.4	60
A + B	
26.0E	53.5
B	
31.5	40
36.4	30
40.8	20
44.5	10
47.7	0

218. (213)
B = $C_{17}H_{14}O$
Dibenzalacetone

A	
61.7	100
54.1	90
44.3	80
A + B	
32.2E	68.6
B	
55.1	60
72.7	50

$C_2H_3ClO_2$

β-Chloroacetic acid

219. (315)
B = $C_2H_4O_2$
Acetic acid

A	
56.68	100
51.0	90
44.5	80
36.9	70
27.4	60
17.0	50
+4.0	40
A + B	
−8.0E	31.5
B	
+2.0	20
10.0	10
16.67	0

220. *v.* p. 173
B = C_6H_6O
Phenol

221. *v.* p. 173
B = C_7H_8O
o-Cresol

222. *v.* p. 173
m-Cresol

223. *v.* p. 173
p-Cresol

224. (313)
B = $C_7H_8O_2$
Guaiacol

°C	Mol % A
A	
56.6	100
51.0	90
45.0	80
38.5	70
32.0	60
25.0	50
17.8	40
A + B	
10.6E	30
B	
17.8	20
24.9	10
32.0	0

225. (315)
B = $C_8H_6O_3$
Piperonal

A	
56.53	100
50.0	90
42.5	80
33.2	70
22.5	60
11.0	50
A + B	
ca. 4.5E	44
B	
7.7	40
15.5	30
23.0	20
29.8	10
35.5	0

226. (315)
B = $C_{10}H_8$
Naphthalene

A	
56.53	100
52.1	90
A + B	
48.5E	80
B	
56.2	70
61.3	60
64.7	50
67.7	40
70.6	30
73.5	20
76.4	10
79.6	0

227. (313)
B = $C_{10}H_8O$
α-Naphthol

°C	Mol % A
A	
56.6	100
51.4	90
A + B	
44.0E	76.5
B	
49.3	70
57.0	60
64.7	50
71.6	40
77.8	30
83.5	20
89.0	10
94.0	0

228. (313)
B = $C_{10}H_8O$
β-Naphthol

A	
56.6	100
49.6	90
A + B	
44.0E	82.5
B	
62.5	70
74.8	60
86.0	50
95.7	40
103.5	30
110.5	20
116.5	10
122.0	0

229. (313)
B = $C_{10}H_{14}O$
Thymol

A	
56.6	100
52.3	90
48.1	80
43.7	70
38.7	60
32.9	50
A + B	
27.5E	43
B	
36.0	30
41.5	20
46.0	10
50.0	0

230. *v.* p. 173
B = $C_{13}H_{10}O_3$
Salol

231. (316)
B = $C_{16}H_{34}O$
Cetyl alcohol

A	
55.7	100
51.7	90
46.0	80
36.0	70

231.—(*Continued*)

°C	Mol % A
A + B	
24.3E	61
B	
27.3	50
31.5	40
36.4	30
40.8	20
44.5	10
47.7	0

v. also 116, 174

$C_2H_3Cl_3O_2$
Chloral hydrate

232. (436)
B = C_2H_6O
Ethyl alcohol

51.5	100
42.5	90
35.0	80
29.0	70
24.5	60
20.0	50
12.0	40
2.0	35

233. (436)
B = C_7H_8

51.5	100
45.0	90
40.0	80
36.5	70
35.0	60
33.5	50
31.5	40
29.0	30
25.7	20
19.0	10
11.5	5

234. (379)
B = $C_{10}H_{20}O$
Menthol

A	
56.5	100
49.9	89.45
42.6	79.05
B	
36.3	4.71
43.0	0

235. (456)
B = $C_{11}H_{12}N_2O$
Antipyrine

A	
51.5	100
35.5	90
A + A_2B	
33.8E	85
A_2B	
44.5	80
59.5	70
61.8	**66**
A_2B + AB	
56E	56
AB	
62.3	**50**

235.—(*Continued*)

°C	Mol % A
AB + B	
50.5E	39
B	
68.8	30
84.2	20
96.8	10
102.8	5
108.9	0

236. (34)
B = $C_{13}H_{10}O_3$
Salol

A	
51.5	100
35.2	90
39.0	80
32.7	70
26.4	60
20.1	50
A + B	
16.0E	43.5
B	
25.3	30
30.9	20
36.2	10
39.1	5
42.0	0

v. also 37

C_2H_3NS
Methyl isothiocyanate

237. (281)
B = $C_{10}H_8$
Naphthalene

A	
34	100
A + B	
40E	65.8
B	
80	0

238. (281)
B = $C_{10}H_{16}$
Camphene

A	
34.0	100
A + B	
−7.5E	28.35
B	
49.3	0

239. (100)
B = $C_{10}H_{16}O$
Camphor

A	
34.0	100
A + B	
−34.2E	50
?	
97U *ca.*	15
B	
178	0

C_2H_4
Ethylene

240. (25)
B = C_2H_6O
Methyl ether

°C	Mol % A
A	
−169.5	100
A + AB	
−178.5E	78.5
AB + B	
−163.2U	50
B	
−138.0	0

$C_2H_4Br_2$
Ethylene dibromide

241. (18, 86)
B = $C_2H_4O_2$
Acetic acid

A	
9.7	100
6.8	90
4.1	80
+1.3	70
−1.2	60
A + B	
−2.76E	52.9
B	
+0.4	40
3.4	30
8.1	20
11.5	10
16.7	0

242. (86)
B = $C_6H_5NO_2$
Nitrobenzene

A	
9.7	100
+ 3.8	90
− 1.5	80
− 7.2	70
−13.6	60
A + B	
−21.46E	48
B	
−16.0	40
−10.8	30
− 5.4	20
+ 0.2	10
5.54	0

243. (428)
B = $C_6H_5NO_3$
o-Nitrophenol

°C	Wt. % A
44.9	0
42.3	5
39.7	10
35.3	20
31.3	30
26.6	40
21.2	50
15.0	60

244. (428)
B = $C_6H_5NO_3$
p-Nitrophenol

°C	Wt. % A
114.0	0
106.7	5
101.5	10
94.0	20
88.3	30
83.5	40
79.1	50
74.5	60
69.5	70

245. *v.* p. 173
B = C_6H_6

246. (86, 375)
B = C_6H_6O
Phenol

°C	Mol % A
A	
10.0	100
5.75	90
+2.6	80
0.0	70
A + B	
−1.0E	65
B	
+0.8	60
6.5	50
12.8	40
19.6	30
26.3	20
33.2	10
40.24	0

247. (17)
B = C_6H_{12}
Cyclohexane

A	
9.7	100
4.7	90
+ 0.6	80
− 2.4	70
− 5.0	60
− 7.9	50
−11.3	40
−15.3	30
A + B	
−25.0E	16.4
B	
−13.3	10
+ 6.3	0

248. *v.* p. 173
B = $C_6H_{12}O_3$
Paraldehyde

249. *v.* p. 173
B = C_7H_7Br
p-Bromotoluene

250. *v.* p. 173
B = C_7H_8

251. *v.* p. 173
B = C_8H_{10}
p-Xylene

252. *v.* p. 173
B = $C_{10}H_8$
Naphthalene

253. (55)
B = $C_{10}H_8O$
β-Naphthol

°C	Wt. % A
A	
10.2	100
A + B	
9.04E	*ca.* 98.5
B	
121.0	0

254. (86)
B = $C_{10}H_{20}O$
Menthol

°C	Mol % A
A	
9.7	100
6.1	90
A + B	
5.4E	86.3
B	
8.7	80
12.7	70
15.1	60
18.1	50
21.8	40
25.9	30
30.6	20
35.8	10
41.2	0

255. *v.* p. 173
B = $C_{12}H_{11}N$
Diphenylamine

256. (413)
B = $C_{12}H_{18}O_8$
Diethyl diacetyl-tartrate

A	
9.95	100
7.90	96.61
5.10	91.92
A + B	
1.95E	86.6
B	
5.3	83.39
14.05	75.39
23.6	65.82
34.2	54.03
42.4	42.11
46.9	34.26
52.0	25.60
55.5	19.11
60.8	9.47
64.5	3.55
67.0	0.00

$C_2H_4Cl_2$
Ethylene dichloride

257. *v.* p. 173
B = C_6H_6

258. *v.* p. 173
B = $C_{10}H_8$
Naphthalene

$C_2H_4N_4$
Dicyanodiamide

259. (156)
B = C_2H_6O
Ethyl alcohol

°C	g A per 100 g B
0	0.937
10	1.18
20	1.47
30	1.91
40	2.55
50	3.31
60	4.12

260. (156)
B = $C_4H_{10}O$
Ethyl ether

°C	g A per 100 g B
0	0.0006
10	0.0009
20	0.0013
30	0.0019
35.3	0.0026

v. also 56

C_2H_4O
Acetaldehyde

261. (435)
B = C_2H_6O
Ethyl alcohol

°C	Mol % A
A	
−123.3	100
−125.5	90
A + AB	
−130.0E	80
AB	
−125.4	70
−123.2	60
−122.2	**50**
AB + AB_2	
−131.0E	40
AB_2	
−122.9	**33**
−132.1	25
AB_2 + B	
−140E	21
B	
−126.5	15
−120.8	10
−114.0	0

262. (186)
B = $C_6H_{12}O_3$
Paraldehyde

°C	Mol % A
A	
−118.45	100
A + B	
−119.9E	98.6
B	
− 71.0	90
− 45.0	80
− 31.0	70
− 21.0	60
− 13.8	50
− 7.7	40
− 2.5	30
+ 2.8	20

262.—(*Continued*)

°C	Mol % A
B	
7.6	10
12.55	0

$C_2H_4O_2$
Acetic acid

263. (255)
B = C_2H_5NO
Acetamide

°C	Mol % A
A	
16.7	100
12.7	95
9.2	90
+ 5.1	85
− 0.4	80
A + AB	
−16.5E	69.4
AB	
− 8.5	60
AB + B	
− 5.5U	52
B	
+26.5	40
43.5	30
50.8	25
57.5	20
69.8	10
80.0	0

264. (385)
B = C_2H_6O
Ethyl alcohol

°C	Mol % A
16.7	100
10.8	90
+ 4.2	80
− 3.0	70
−11.6	60
−22.2	50
−35.2	40
−53.4	30
−81.0	20

265. (385)
B = C_3H_8O
Propyl alcohol

°C	Mol % A
16.7	100
10.5	90
+ 4.3	80
− 3.0	70
−11.2	60
−21.1	50
−33.9	40
−51.8	30
−68.5	20

266. (385)
B = $C_4H_6O_3$
Acetic anhydride

°C	Mol % A
16.7	100
11.0	90
+ 5.4	80
− 0.2	70
− 5.8	60
−12.4	50
−19.8	40
−30.0	30
−44.8	20
−68.1	10

267. *v.* p. 173
B = $C_4H_6O_4$
Dimethyl oxalate

268. (385)
B = $C_4H_8O_2$
Ethyl acetate

°C	Mol % A
16.7	100
9.7	90
+ 2.1	80
− 6.1	70
−14.4	60
−24.1	50
−34.0	40
−47.3	30
−64.8	20

269. (385)
B = $C_4H_{10}O$
Ethyl ether

°C	Mol % A
16.7	100
10.5	90
+ 4.0	80
− 3.2	70
−11.3	60
−20.2	50
−29.5	40
−42.0	30
−59.5	20

270. (210)
B = $C_6H_3N_3O_7$
Picric acid

°C	Mol % A
A	
16.4	100
A + B	
14.1E	96.4
B	
50.8	90
69.4	80
80.0	70
87.3	60
93.1	50
98.4	40
103.5	30
108.6	20
113.4	10
118.5	0

271.
B = $C_6H_4N_2O_4$
m-Dinitrobenzene
v. Seidell, p. 131

273. (19, 86)
B = $C_6H_5NO_2$
Nitrobenzene

°C	Mol % A
A	
16.7	100
11.0	90
6.3	80
+2.5	70
−1.2	60
−5.4	50
A + B	
−8.2E	44

273.—(*Continued*)

°C	Mol % A
B	
−3.3	30
−0.3	20
+2.6	10
5.6	0

274. (18, 86, 87, 142, 212, 401)
B = C_6H_6

°C	Mol % A
A	
16.7	100
10.9	90
6.25	80
+2.25	70
−1.8	60
−5.9	50
A + B	
−8.8E	43
B	
−4.25	30
−0.8	20
+2.5	10
5.5	0

275. *v.* p. 173
B = C_6H_6O
Phenol

276. (353)
B = C_6H_7N
Aniline

°C	Mol % A
A	
16.6	100
13.1	95
+ 7.8	90
− 6.8m	85
−16.3m	80
A + A_2B	
− 3.2E	84.2
A_2B	
+ 7.6	80
14.0	75
16.3	70
16.7	**66**
15.7	60
11.8	50
+ 5.7	40
− 2.0	30
− 7.2	25
−13.7	20
A_2B + B	
−15.7E	13.7
AB_2	
−20.1m	40
−19.8m	28
−18.6m	25
−16.4m	20
B	
−11.5	10
− 8.8	5
− 6.0	0

277. *v.* p. 173
B = $C_6H_{10}O_4$
Dimethyl succinate

279. *v.* p. 173
B = $C_7H_6O_2$
Benzoic acid

280. (255)
B = C_7H_7NO
Benzamide

°C	Mol % A
A	
16.7	100
12.0	90
+7.0	80
A + B	
−2.0E	83
B	
+9.0	80
23.7	75
35.5	70
56.4	60
74.2	50
102.0	30
111.6	20
119.4	10
126.5	0

281. (208)
B = $C_7H_8O_2$
Dimethylpyrone

°C	Mol % A
A	
16.4	100
12.8	90
8.6	80
+2.7	85
A + AB	
−3.0E	80.5
AB	
+9.7	75
18.0	70
23.9	65
AB + B	
25U	63
B	
38.5	60
55.8	55
70.8	50
83.5	45
94.0	40
102.5	35
109.4	30
115.0	25
119.8	20
123.8	15
127.2	10
132.1	0

281.1. (353.1)
B = C_7H_9N
o-Toluidine

°C	Mol % A
A	
16.6	100
A + AB	
− 5.9E	83.1
AB	
24.8	**50**
AB + B	
−28.5E	2.0
B	
−27.7	0

281.2. (353.1)
B = C_7H_9N
m-Toluidine

°C	Mol % A
A	
16.6	100
A + A_2B	
− 5.6E	83.9
A + A_2B (Metastable)	
− 8.8E	82.4
A_2B	
10.0	**66.7**
A_2B (Metastable)	
7.3	**66.7**
A_2B + B	
−38.5E	13.5
A_2B + B (Metastable)	
−40.0E*ca.*	*ca.*16.0
B	
−31.0	0

281.3. (353.1)
B = C_7H_9N
p-Toluidine

°C	Mol % A
A	
16.6	100
A + A_2B	
6.1E	88.9
A_2B	
48.0	**66.7**
A_2B + B	
27.9E	30.4
B	
43.0	0

282. (375, 377)
B = C_8H_{10}
p-Xylene

°C	Mol % A
A	
16.7	100
11.5	90
8.1	80
3.3	70
A + B	
0.5E	61.7
B	
3.2	50
5.3	40
7.5	30
9.4	20
11.3	10
13.2	0

282.1. (353.1)
B = $C_8H_{11}N$
Dimethylaniline

°C	Mol % A
A	
16.6	100
A + AB	
− 9.3E	81.7
AB	
+18.9	**50**
AB + B	
− 9.6	9.4
B	
− 4.9	0

282.2. (353.1)
B = $C_9H_{13}N$
2, 4, 6-Trimethylaniline

°C	Mol % A
A	
16.6	100
A + B	
−24.0 *ca.*	70.0
B	
2.2	0

283. (452, 475)
B = $C_{10}H_8$
Naphthalene

°C	Mol % B
0	2.4
10	3.5
20	5.2
30	7.6
40	11.9
50	19.7
60	34.3
70	59.0

283.1. (475)
B = $C_{10}H_9N$
β-Naphthylamine

°C	Mol % A
16.7	100
45.0	80
67.0	70
82.0	60
89.0?	50
94.0	40
98.0	30
101.0	20
105.0	10
107.5	5
110.6	0

284. *v.* p. 173
B = $C_{10}H_{14}O$
Thymol

285. *v.* p. 174
B = $C_{12}H_9N$
Carbazole

286. (345)
B = $C_{13}H_{10}$
Fluorene

°C	Mol % B
20.0	0.80
30.0	1.30
40.0	1.9
50.0	2.9
60.0	4.5
70.0	6.9
80.0	11.6

287. *v.* p. 174
B = $C_{14}H_8O_2$
Anthraquinone

288. *v.* p. 174
B = $C_{14}H_{10}$
Anthracene

289. (475)
B = $C_{14}H_{10}$
Phenanthrene

289.—(*Continued*)

°C	g B per 100 g A
30.0	6.0
40.0	9.5
50.0	15.0
60.0	26.0
70.0	46.0
75.0	93.0
80.0	160.0

290.
B = $C_{16}H_{18}N_2O_2$
p-Azophenetole
v. Seidell, p. 104

v. also 21, 59, 64, 82, 117, 175, 189, 219, 241

$(C_2H_4O_2)_2$
Acetic acid

290.1. (20)
B = C_6H_5Cl
Chlorobenzene

°C	Mol % A
16.7	100
14.4	90
11.9	80
9.2	70
6.0	60
+ 2.5	50
− 1.0	40
− 5.0	30
−10.0	20

290.2. (19, 86)
B = $C_6H_5NO_2$
Nitrobenzene

16.7	100
13.5	90
10.5	80
7.4	70
4.6	60
+1.4	50
−2.3	40
−7.7	30
−4.2	20
−0.3	10
+5.6	0

290.3. (17)
B = C_6H_{12}
Cyclohexane

A	
16.7	100
14.0	90
12.6	80
11.7	70
11.2	60
11.0	50
10.8	40
10.5	30
9.9	20
6.7	10
0.0	5
A + B	
−2.5E	4.4
B	
6.7	0

C_2H_5Cl
Ethyl chloride
v. 18

C_2H_5I
Ethyl iodide

291. (482)
B = $C_4H_{10}O$
Ethyl ether

°C	Mol % A
A	
− 63.5	100
A + B	
−125.0E	*ca.* 18
B	
−117.6	0

C_2H_5NO
Acetamide

292. *v.* p. 174
B = C_2H_6O
Ethyl alcohol
v. also 1852

293. *v.* p. 174
B = $C_3H_7NO_2$
Urethane

294. (255)
B = $C_4H_6O_3$
Acetic anhydride

°C	Mol % A
80.0	100
75.0	95
71.0	90
65.5	80
61.5	70
56.0	60
51.3	50
46.0	40
40.0	30
+30.5	20
− 0.5	10

295. (231)
B = $C_6H_5NO_3$
o-Nitrophenol

°C	Wt. % A
A	
76.5	100
A + B	
41.2	5
B	
44.8	0

296. (231)
B = $C_6H_5NO_3$
m-Nitrophenol

A	
76.5	100
A + AB	
42.1E	46
AB	
51.5	**50**
AB + B	
25.0	22
B	
95.0	0

297. (231)
B = $C_6H_5NO_3$
p-Nitrophenol

°C	Wt. % A
A	
76.5	100
A + AB	
66.3E	69
AB	
96.1	**25.3**
AB + B	
77.5E	14
B	
112.0	0

298. (267)
B = C_6H_6O
Phenol

A	
76.2	100.0
70.0	86.3
60.0	71.7
50.0	61.7
40.0	53.8
30.0	47.3
A + AB_2	
27.0E	46.0
AB_2	
30.0	43.4
40.0	29.5
40.8	**32.1**
40.0	20.0
30.0	11.0
AB_2 + B	
27.5E	8
B	
40.5	0

v. also 1852

299. (231)
B = $C_6H_6O_2$
Catechol

A	
76.5	100
A + A_2B	
34.7E	57.5
A_2B	
37.5	*ca.* **51.7**
A_2B + B	
17.6E	34
B	
102.8	0

300. (231)
B = $C_6H_6O_2$
Resorcinol

A	
76.5	100
32.0	69.4
?	
vis.	69.4 to 48.2
B	
9.0	48.2
108.5	0

301. (231)
B = $C_6H_6O_2$
Hydroquinol

°C	Wt. % A
A	
76.5	100
A + AB	
60.3E	73.0
AB	
101.0	**35**
AB + B	
98.8E	33.5
B	
169.0	0

302. (273)
B = $C_6H_6O_3$
Pyrogallol

A	
76.5	100
67.5	83.9
58.4	76.5
46	68.2
20	57.6
A + (?)	
11E	54.0
No solid phase	
B	
44	29.2
70	24.5
86	19.4
108.4	9.6
126	0.0

303. (255)
B = $C_7H_6O_2$
Benzoic acid

°C	Mol % A
A	
80.0	100
76.0	95
72.2	90
69.0	80
54.3	70
48.7	60
A + B	
38.0E	55
B	
56.0	50
80.7	40
94.0	30
104.5	20
113.7	10
117.5	5
121.5	0

304. (231)
B = $C_7H_6O_3$
Salicylic acid

°C	Wt. % A
A	
76.5	100
A + AB	
52.2E	52
AB + B	
63.0U	35
B	
157	0

305. (294)
B = $C_8H_6O_2$
Phthalide

°C	Wt. % A
A_s	
79.2	100
A_m	
69.1	100
A_m + B_s	
52.5E	44.5
A_m + B_m	
47.0E	28.5
A_s + B_s	
57.5E	25
A_s + B_m	
52.6E	15.5
B_m	
65.0	0
B_s	
72.8	0

306. (269)
B = $C_8H_{10}N_2O$
Nitrosodimethylaniline

A	
76.2	100
A + AB_2	
62.5E	29
AB_2	
70.0	**16.4**
AB_2 + B	
70E *ca.*	13
B	
83.2	0

307. (231)
B = $C_{10}H_8O$
α-Naphthol

A	
76.5	100
A + B	
9.4E	33
B	
92.0	0

308. (231)
B = $C_{10}H_8O$
β-Naphthol

A	
76.5	100
A + AB	
53.2E	52
AB	
63.0	**30**
AB + B	
61.4E	25
B	
122.0	0

309. (100)
B = $C_{10}H_{16}O$
Camphor

°C	Mol % A
A	
82.0	100
A + B	
70.2E	87.5

C_2H_5NO.—(*Continued*)

309.—(*Continued*)

°C	Mol % A
B	
178.0	0

310. (255)
B = $C_{14}H_{10}O_3$
Benzoic anhydride

A	
82.0	100
79.5	95
76.5	90
71.0	80
A + AB	
68.0E	75
AB	
73.0	70
81.0	60
84.0	**50**
80.5	40
72.0	30
58.0	20
41.0	10
AB + B	
36.0E	7
B	
42.0	0

311. (294)
B = $C_{19}H_{17}N_3$
Triphenylguanidine

°C	Wt. % A
A_s	
79.2	100
A_m	
69.1	100
$A_m + B_s$	
68.0E	95.75
$A_m + B_m$	
67.8E	94.9
$A_s + B_s$	
77.8E	93.5
$A_s + B_m$	
77.6E	92.1
B_m	
138	0
B_s	
144.2	0

v. also 263, 1852

$C_2H_6N_2O$

Methylurea

313. (229)
B = C_6H_6O
Phenol

°C	Wt. % A
A	
98.0	100
94.5	95
90.8	90
83.2	80
74.0	70
61.7	60
43.7	50
30.0	45

313.—(*Continued*)

°C	Wt. % A
A + AB	
+8.0U	40
AB	
− **0.1**	**30**
AB + B	
− 7.0E	24
B	
+25.1	10
33.9	5
40.6	0

C_2H_6O

Ethyl alcohol

314. *v.* p. 174
B = $C_3H_7NO_2$
Urethane

315. (477)
B = $C_4H_4O_4$
Fumaric acid

°C	g B per 100 g A
29.7	5.75

316. (477)
B = $C_4H_4O_4$
Maleic acid

29.7	69.9

317. (436)
B = $C_4H_5NO_2$
Succinimide

°C	Mol % B
60	12.4
40	4.77
20	2.04
0	0.88

318.
B = $C_5H_{11}NO_2$
Betaine
v. Seidell, p. 149

319.
B = $C_6H_3N_3O_7$
Picric acid
v. Seidell, p. 493

320. (419)
B = $C_6H_4Br_2$
p-Dibromobenzene

°C	Mol % B
30	3.0
40	4.6
50	7.0
60	11.1
70	21.1
75	46.8
80	76.4
87	100.0

321. (71)
B = $C_6H_5NO_3$
o-Nitrophenol

°C	Wt. % A
44.0	0
41.3	5
39.0	10
36.0	20
34.5	30

321.—(*Continued*)

°C	Wt. % A
33.5	40
32.0	50
30.0	60
26.0	70
19.3	80
2.5	90

322. (71)
B = $C_6H_5NO_3$
m-Nitrophenol

95.2	0
86.0	5
77.0	10
56.0	20
34.5	30
+13.5	40
− 8.5	50

323. (71)
B = $C_6H_5NO_3$
p-Nitrophenol

114.0	0
99.5	5
85.0	10
61.0	20
38.0	30
+15.0	40
− 8.5	50

323.1. (267, 436)
B = C_6H_6O
Phenol

10.0	15.0
20.0	11.1
30.0	6.2
40.5	0.0

v. also 1852

324. (436)
B = $C_6H_6O_2$
Resorcinol

°C	Mol % A
110.4	0
75.0	40
58.2	50
25.2	60

325.
B = $C_7H_5NO_4$
o-Nitrobenzoic acid
v. Seidell, p. 141, 143

326.
B = $C_7H_5NO_4$
m-Nitrobenzoic acid
v. Seidell, p. 141, 143

327.
B = $C_7H_5NO_4$
p-Nitrobenzoic acid
v. Seidell, p. 141, 144

328. (443)
B = $C_7H_5N_5O_8$
Trinitrophenyl-methylnitroamine
(Tetryl)

328.—(*Continued*)

°C	g B per 100 g A
0	0.320
10	0.425
20	0.563
30	0.76
40	1.12
50	1.72
60	2.64
70	4.23

329. B = $C_7H_6O_2$
Benzoic acid
v. Seidell, p. 134, 135, 136

331. (426)
B = $C_7H_6O_3$
Salicylic acid

°C	Wt. % A
159.0	0
142.0	10
123.0	20
104.5	30
84.0	40
62.5	50
40.0	60
0.0	70

332. (426)
B = $C_7H_6O_3$
m-Hydroxybenzoic acid

201.3	0
184.0	10
166.0	20
148.0	30
129.5	40
106.0	50
68.0	60

333. (426)
B = $C_7H_6O_3$
p-Hydroxybenzoic acid

213.0	0
197.0	10
178.0	20
156.0	30
135.0	40
110.0	50
72.0	60

334. (436)
B = C_7H_7NO
Benzamide

°C	Mol % B
72.3	20.86
50.4	14.44
32.6	8.72
10.4	4.25
0.0	3.08

335. *v.* p. 174
B = C_7H_9N
p-Toluidine

336. B = $C_8H_6O_4$
o-Phthalic acid
v. Seidell, p. 490

337.
B = $C_8H_7BrClNO$
2-Bromo-4-chloro-acetanilide
v. Seidell, p. 4

338.
B = $C_8H_7BrClNO$
4-Bromo-2-chloro-acetanilide
v. Seidell, p. 4

339.
B = $C_8H_7Br_2NO$
2, 4-Dibromo-acetanilide
v. Seidell, p. 4

340.
B = $C_8H_7Cl_2NO$
2, 4-Dichloro-acetanilide
v. Seidell, p. 4

341.
B = C_8H_8BrNO
p-Bromoacetanilide
v. Seidell, p. 4

342.
B = C_8H_8ClNO
p-Chloroacetanilide
v. Seidell, p. 4

343.
B = $C_8H_8O_2$
Phenylacetic acid
v. Seidell, p. 12

344.
B = $C_8H_8O_3$
dl-Mandelic acid
v. Seidell, p. 399

345. *v.* p. 174
B = C_8H_9NO
Acetanilide

346.
B = $C_8H_{10}N_4O_2$
Caffeine
v. Seidell, p. 186

347.
B = $C_9H_{10}O_2$
Hydrocinnamic acid
v. Seidell, p. 570

348. (436, 452)
B = $C_{10}H_8$
Naphthalene

°C	Mol % B
0.0	1.8
10.0	2.45
20.0	3.4
30.0	4.6
40.0	6.55
50.0	10.0
60.0	17.3
70.0	39.2

348.1. (475)
B = $C_{10}H_9N$
α-Naphthylamine

348.1.—(*Continued*)

°C	Mol % A
10.5	80
16.8	70
21.3	60
25.0	50
28.5	40
32.0	30
36.5	20
42.5	10
46.0	5
49.4	0

349.
B = $C_{10}H_{15}BrO$
α-Bromocamphor
v. Seidell, p. 225

349.1. (71.1)
B = $C_{10}H_{16}O$
Camphor

°C	g B per 100 g A
0.0	104.0
25.0	181.0
52.9	311.0

350.
B = $C_{10}H_{16}O_4$
Camphoric acid
v. Seidell, p. 225

351. (475)
B = $C_{12}H_9N$
Carbazole

20.0	0.75
30.0	1.02
40.0	1.35
50.0	1.77
60.0	2.3
70.0	2.95

352. (436)
B = $C_{12}H_{10}$
Acenaphthene

°C	Mol % B
0.0	0.57
10.0	0.84
20.0	1.18
30.0	1.69
40.0	2.51
50.0	3.90
60.0	6.43
70.0	11.7

353.
B = $C_{12}H_{10}N_2$
Azobenzene
v. Seidell, p. 103

354.
B = $C_{12}H_{24}O_2$
Lauric acid
v. Seidell, p. 349

355. (345)
B = $C_{13}H_{10}$
Fluorene

°C	Mol % B
10.0	0.38
20.0	0.52

355.—(*Continued*)

°C	Mol % B
30.0	0.63
40.0	0.85
50.0	1.17
60.0	1.75
70.0	2.7
80.0	4.6

356. *v.* p. 174
B = $C_{14}H_8O_2$
Anthraquinone

357. (475)
B = $C_{14}H_{10}$
Anthracene

°C	g B per 100 g A
20.0	0.077
30.0	0.138
40.0	0.225
50.0	0.33
60.0	0.463
70.0	0.675

358. (153, 475)
B = $C_{14}H_{10}$
Phenanthrene

20.0	2.5
30.0	3.7
40.0	5.5
50.0	8.1
60.0	12.3

358.1. (71.1)
B = $C_{14}H_{10}O_2$
Benzil

0.2	1.82
25.0	4.89
66.4	89.6

359.
B = $C_{14}H_{28}O_2$
Myristic acid
v. Seidell, p. 443

360.
B = $C_{16}H_{32}O_2$
Palmitic acid
v. Seidell, p. 474

361.
B = $C_{16}H_{34}O$
Cetyl alcohol
v. Seidell, p. 244

362. (163)
B = $C_{16}H_{35}NO_2$
Ammonium palmitate

°C	A, g/l
A	
0	0.5
10	0.7
20	1.4
40	4.5
50	11.0

363.
B = $C_{18}H_{36}O_2$
Stearic acid
v. Seidell, p. 677

364. (163)
B = $C_{18}H_{37}NO_2$
Ammonium oleate

°C	A, g/l
A	
0	31.0
10	59.0
50	100.0

364.1. (163)
B = $C_{18}H_{39}NO_2$
Ammonium stearate

A	
0	0.1
10	0.3
20	0.5
30	0.9
40	1.8
50	5.5

v. also 68, 114, 232, 259, 261, 264, 292, 1852

C_2H_6O
Methyl ether

365.
B = $C_7H_6O_3$
Salicylic acid
v. Seidell, p. 591

v. also 19, 63, 172, 240

$C_3H_3Cl_3O_3$
Trichlorolactic acid

366. (208)
B = $C_7H_8O_2$
Dimethylpyrone

°C	Mol % A
A	
113.8	100
110.6	95
106.6	90
100.0	85
88.5	80
70.0	75
A + AB	
34.0E	68.5
AB	
40.3	65
47.8	60
52.6	55
54.5	**50**
52.8	45
AB + B	
50.0E	41
B	
77.1	35
95.2	30
108.1	25
116.7	20
122.6	15
126.5	10
132.1	0

$C_3H_5IO_2$
β-Iodopropionic acid

367. (208)
B = $C_7H_8O_2$
Dimethylpyrone

°C	Mol % A
A	
81.2	100
77.2	95
72.7	90
66.9	85
59.4	80
50.2	75
39.0	70
26.3	65
A + B	
7.0E	58
B	
20.7	55
42.5	50
60.3	45
75.0	40
87.4	35
97.8	30
106.7	25
114.0	20
120.0	15
124.5	10
132.1	0

C_3H_6O
Acetone

368. (477)
B = $C_4H_4O_4$
Fumaric acid

°C	g B per 100 g A
29.7	1.72

369. (477)
B = $C_4H_4O_4$
Maleic acid

29.7	35.77

370. (53)
B = C_6H_5ClO
o-Chlorophenol

°C	Wt. % A
A	
−94.0	100
A + AB	
−97.1E	87.5
AB	
−83.7	80
−70.0	70
−59.3	60
−54.5	55
−50.1	50
−46.2	45
−42.8	40
−40.5	35
−39.8	**31**
−42.6	25
AB + B	
−47.6E	21.5

370.—(*Continued*)

°C	Wt. % A
B	
−18.0	15
− 4.0	10
+ 3.5	5
8.0	0

371. (71)
B = $C_6H_5NO_3$
o-Nitrophenol

44.0	0
39.0	5
34.4	10
26.1	20
18.0	30
+9.1	40
−0.4	50

372. (71)
B = $C_6H_5NO_3$
m-Nitrophenol

95.2	0
85.5	5
75.5	10
54.0	20
29.0	30

373. (71)
B = $C_6H_5NO_3$
p-Nitrophenol

114.0	0
103.0	5
89.5	10
61.0	20
26.0	30

374. (292)
B = C_6H_6O
Phenol

A	
−95.0	100
AB_2	
−59.0	80
−40.0	70
−22.0	60
−14.0	55
− 7.2	50
− 1.0	45
+ 4.5	40
9.5	35
13.1	30
15.0	**23.5**
14.2	20
AB_2 + B	
4.0E	15.5
B	
20.0	10
32.0	5
41.0	0

375. (292)
B = $C_6H_6O_2$
Catechol

A	
−95.0	100
AB	
−64.0	60
−50.0	55

375.—(*Continued*)

°C	Wt. % A
AB	
−40.0	50
−33.3	45
AB + B	
−30.0U	41
B	
+18.0	35
42.0	30
58.0	25
73.0	20
85.5	15
96.0	10
105.6	5
115.0	0

376. (292)
B = $C_6H_6O_2$
Resorcinol

A	
−95.0	100
A_2B	
−58.5	80
−43.0	70
−32.0	60
−28.9	55
−28.5	**51**
−33.2	45
A_2B + B	
−45.0E	41
B	
+12.0	35
41.5	30
59.5	25
75.0	20
87.7	15
97.8	10
104.5	5
109.0	0

377. (292)
B = $C_6H_6O_2$
Hydroquinol

A	
−95.0	100
AB	
− 4.0	90
+22.0	80
42.0	70
52.5	60
64.0	50
137.0	40
148 *ca.*	**34.5**
147.0	30
B	
145.0	20
158.5	10
169.0	0

378. (292)
B = $C_6H_6O_3$
Pyrogallol

A	
−95.0	100
A_3B	
−63.0	90
−42.7	80
−29.5	70

378.—(*Continued*)

°C	Wt. % A
A_3B	
−23.9	**58**
−24.4	55
−27.5	50
A_3B + B	
−34.0E	45
B	
+ 8.5	40
38.0	35
60.0	30
78.0	25
95.0	20
111.0	15
126.0	10
140.5	5
155.0	0

379. (71.1, 344)
B = $C_7H_6O_2$
Benzoic acid

121.4	0
72.0	40
54.5	50
34.5	60
6.5	70

379.1. (316)
B = $C_7H_6O_3$
Salicylic acid

°C	g B per 100 g A
25.0	55.5

380. *v.* p. 174
B = $C_{10}H_8$
Naphthalene

381. *v.* p. 174
B = $C_{12}H_9N$
Carbazole

381.1. (71.1)
B = $C_{10}H_{16}O$
Camphor

°C	g B per 100 g A
0.0	209.0
25.0	261.0
45.0	372.0

382. *v.* p. 174
B = $C_{12}H_{10}$
Acenaphthene

383. *v.* p. 174
B = $C_{13}H_{10}$
Fluorene

384. *v.* p. 174
B = $C_{14}H_8O_2$
Anthraquinone

385. *v.* p. 174
B = $C_{14}H_{10}$
Anthracene

386. *v.* p. 174
B = $C_{14}H_{10}$
Phenanthrene

$C_3H_6O_2$

Propionic acid

387.
B = $C_6H_4N_2O_4$
m-Dinitrobenzene
v. Seidell, p. 131

388. (452)
B = $C_{10}H_8$
Naphthalene

°C	Mol % B
0.0	6.0
10.0	8.4
20.0	11.5
30.0	15.8
40.0	22.2
50.0	31.6
60.0	46.3
70.0	67.2

v. also 65, 83, 110

$C_3H_7ClO_2$

Propionic acid hydrochloride
v. 84

$C_3H_7NO_2$

Urethane

389. *v.* p. 174
B = C_3H_8O
Propyl alcohol

390. *v.* p. 174
B = $C_5H_{12}O$
n-Amyl alcohol

391. (392)
B = $C_6H_4N_2O_4$
m-Dinitrobenzene

°C	Mol % A
A	
48.3	100
A + B	
42.0E	88.5
B	
52.0	80
61.0	70
67.5	60
71.0	50
73.6	40
77.5	30
81.5	20
85.8	10
90.0	0

392. (396)
B = C_6H_6

A	
48.3	100
42.5	90
38.7	80
35.7	70
33.1	60
30.6	50
28.1	40
25.3	30
22.0	20
16.0	10

392.—(*Continued*)

°C	Mol % A
A + B	
4.2E	3
B	
5.5	0

393. (326)
B = C_6H_6O
Phenol

A	
48.0	100
42.0	90
34.7	80
24.7	70
+12.0	60
− 5.3	50
A + B	
−25.0E	41.3
B	
+ 1.0	30
19.0	20
31.5	10
40.5	0

394. (318, 465)
B = $C_7H_7NO_2$
p-Nitrotoluene

A	
48.3	100
42.6	90
38.6	80
35.1	70
A + B	
33.5E	65
B	
35.6	60
38.7	50
41.2	40
43.5	30
45.3	20
48.0	10
51.3	0

395. (318, 393)
B = $C_7H_7NO_3$
p-Nitroanisole

A	
48.3	100
43.8	90
39.7	80
36.5	70
A + B	
34.2E	63
B	
38.0	50
40.8	40
43.6	30
46.5	20
49.6	10
52.6	0

396. (436)
B = C_7H_8
Toluene

47.0	100
41.7	90
38.1	80
35.3	70
32.9	60

396.—(*Continued*)

°C	Mol % A
30.5	50
28.1	40
25.4	30
22.2	20
16.5	10
0	1.77

397. *v.* p. 174
B = C_8H_9NO
Acetanilide

398. (318)
B = $C_{10}H_7NO_2$
α-Nitronaphthalene

°C	Mol % A
A	
48.3	100
43.3	90
A + B	
38.8E	81
B	
41.5	70
43.8	60
45.8	50
48.3	40
50.5	30
52.2	20
54.5	10
58.0	0

399. (393)
B = $C_{12}H_{11}N$
Diphenylamine

A	
48.3	100
44.1	90
39.8	80
35.5	70
A + B	
32.2E	61
B	
36.3	50
39.6	40
42.4	30
45.4	20
48.9	10
53.2	0

400. (34)
B = $C_{13}H_{10}O_3$
Salol

A	
48.5	100
43.7	90
39.6	80
36.3	70
33.5	60
31.0	50
A + B	
29.0E	43
B	
33.6	30
36.8	20
39.7	10
42.0	0

v. also 39, 85, 293, 314

$C_3H_8N_2O$

sym-Dimethylurea

401. (229)
B = C_6H_6O
Phenol

°C	Wt. % A
A	
102.0	100
97.5	95
92.5	90
79.0	80
59.0	70
30.2	60
A + AB_2	
−3.0E	53
AB_2	
+1.5	50
11.2	40
14.0	**31.8**
AB_2 + B	
5.0E	18.5
B	
27.0	10
35.2	5
40.6	0

$C_3H_8N_2O$

asym-Dimethylurea

402. (229)
B = C_6H_6O
Phenol

A	
178.0	100
173.8	95
169.2	90
159.0	80
145.7	70
127.4	60
99.0	50
58.5	40
A + AB	
25.2U	34
AB	
14.5	20
AB + B	
9.0E	17
B	
26.0	10
34.8	5
40.6	0

C_3H_8O

Propyl alcohol

403. (419)
B = $C_6H_4Br_2$
p-Dibromobenzene

°C	Mol % B
30	4.5
40	6.7
50	10.0
60	17.2
70	38.5
75	61.0
80	82.3
87	100.0

404.
B = $C_6H_4N_2O_4$
m-Dinitrobenzene
v. Seidell, p. 131, 132

405. (385)
B = C_6H_6

°C	Mol % A
5.5	0
2.8	10
+ 1.3	20
0.0	30
− 1.6	40
− 3.75	50
− 6.8	60
−12.8	70
−24.8	80
−47.0	90
−59.0	92.5
−78.0	95

406.
B = $C_7H_5NO_4$
o-Nitrobenzoic acid
v. Seidell, p. 143

407.
B = $C_7H_5NO_4$
m-Nitrobenzoic acid
v. Seidell, p. 143

408.
B = $C_7H_5NO_4$
p-Nitrobenzoic acid
v. Seidell, p. 144

409.
B = $C_7H_6O_2$
Benzoic acid
v. Seidell, p. 135

410.
B = $C_7H_6O_3$
Salicylic acid
v. Seidell, p. 591

411.
B = $C_8H_6O_4$
o-Phthalic acid
v. Seidell, p. 490

412.
B = $C_8H_8O_2$
Phenylacetic acid
v. Seidell, p. 12

413.
B = $C_8H_8O_3$
dl-Mandelic acid
v. Seidell, p. 399

414.
B = $C_9H_{10}O_2$
Hydrocinnamic acid
v. Seidell, p. 570

415. (436, 452)
B = $C_{10}H_8$
Naphthalene

°C	Mol % B
0.0	2.05
10.0	2.6
20.0	3.7
30.0	5.1

415.—(*Continued*)

°C	Mol % B
40.0	7.15
50.0	10.9
60.0	19.0
70.0	45.2

416.
B = $C_{10}H_{16}O_4$
Camphoric acid
v. Seidell, p. 225

417. (436)
B = $C_{12}H_{10}$
Acenaphthene

°C	Mol % B
0.0	0.66
10.0	0.91
20.0	1.31
30.0	1.86
40.0	2.80
50.0	4.40
60.0	7.4
70.0	13.5

418.
B = $C_{12}H_{10}N_2$
Azobenzene
v. Seidell, p. 103

419.
B = $C_{12}H_{24}O_2$
Lauric acid
v. Seidell, p. 349

420.
B = $C_{14}H_{28}O_2$
Myristic acid
v. Seidell, p. 443

421.
B = $C_{16}H_{32}O_2$
Palmitic acid
v. Seidell, p. 474

v. also 69, 265, 389

C_3H_8O

Isopropyl alcohol
v. 70

$C_4H_4O_4$

Fumaric acid

422. (477)
B = $C_4H_{10}O$
Ethyl ether

°C	g A per 100 g B
25.0	0.72

423. (477)
B = C_6H_6

25.0	0.003

424. (477)
B = C_8H_{10}
Xylene

29.7	0.027

v. also 4, 40, 315, 368

$C_4H_4O_4$
Maleic acid

425. (477)
B = $C_4H_{10}O$
Ethyl ether

°C	g A per 100 g B
25.0	8.19

426. (477)
B = C_6H_6

25.0	0.024

427. (72)
B = $C_8H_8O_3$
l-Mandelic acid

°C	Wt. % A
A	
137.2	100
133.4	90.6
131.4	81
130.0	70
128.0	59.4
122.2	49.9
115.7	40.7
A + B	
112.5E	37.0
B	
115.3	23.8
119.3	19.7
125.7	10.3
132.9	0

428. (477)
B = C_8H_{10}
Xylene

°C	g A per 100 g B
29.7	0.0085

v. also 5, 41, 316, 369

C_4H_4S
Thiophene

429. (458)
B = C_6H_6

°C	Mol % A
Mix.	
−37.1	100
−34.3	90
−31.5	80
−28.2	70
−24.3	60
−19.4	50
−14.0	40
− 8.5	30
− 3.5	20
+ 1.2	10
5.4	0

430. (147)
B = $C_{19}H_{16}$
Triphenylmethane

°C	Mol % A
AB	
25.7	89.2
33.5	86.5
44.0	78.9
47.6	75.6
53.5	67.1
57.4	55.3

430.—(*Continued*)

°C	Mol % A
AB + B	
57.6U	49.0
B	
62.7	44.0
67.0	39.2
67.2	38.7
74.2	29.5
79.0	23.7
87.2	10.1
92.0	0

$C_4H_5BrO_4$
l-Bromosuccinic acid

432. (72)
B = $C_4H_5ClO_4$
d-Chlorosuccinic acid

°C	Wt. % A
A	
175.7	100
168.9	89.5
163.7	79.1
160.8	70.0
157.2	59.9
A + AB (?)	
157.0E	55.0
AB(?)	
157.3	50.0
AB(?) + B	
157.0E	45.0
B	
161.6	30.2
164.5	20.7
171.5	10.2
176.5	0.0

433. (72)
B = $C_4H_5ClO_4$
dl-Chlorosuccinic acid

°C	Wt. % A
A	
175.7	100
172.6	89.7
169.3	80.9
165.9	69.5
165.8	60.0
163.1	49.5
159.5	39.8
155.7	29.3
154.1	20.0
153.7	15.0
(Min.)	
153.9	9.7
156.0	0.0

$C_4H_5ClO_2$
α-Chlorocrotonic acid

434. (208)
B = $C_7H_8O_2$
Dimethylpyrone

°C	Mol % A
A	
99.0	100
96.5	95

434.—(*Continued*)

°C	Mol % A
A	
93.2	90
88.3	85
81.3	80
72.6	75
62.0	70
48.4	65
A + AB	
39.0E	62
AB	
44.7	55
45.8	**50**
AB + B	
45.8E	49
B	
64.4	45
81.5	40
93.9	35
103.0	30
110.3	25
116.8	20
122.0	15
125.9	10
132.1	0

$C_4H_5ClO_4$
d-Chlorosuccinic acid

435. (72)
B = $C_4H_5ClO_4$
l-Chlorosuccinic acid

°C	Mol % A
A	
176.0	100
172.7	95
169.5	90
163.0	80
156.5	70
A + AB	
152.5E	64
AB	
156.0	**50**
154.0	40
AB + B	
152.5E	36
B	
156.5	30
163.0	20
169.5	10
172.7	5
176.0	0

v. also 432

$C_4H_5Cl_3O_2$
Trichlorobutyric acid

436. (208)
B = $C_7H_8O_2$
Dimethylpyrone

°C	Mol % A
A	
57.9	100
55.0	95
50.4	90
42.5	85
A + A_2B	
21.0E	78

436.—(*Continued*)

°C	Mol % A
A_2B	
27.2	75
32.6	70
33.8	**66**
A_2B + AB	
32.5E	64
AB	
44.7	60
52.8	55
56.2	**50**
AB + B	
52.5E	44.5
B	
74.7	40
92.0	35
104.8	30
113.0	25
119.1	20
123.8	15
127.2	10
132.1	0

C_4H_5N
Crotononitrile

436.1. (291)
B = C_6H_7N
Aniline

°C	Wt. % A
−72.1	100
−74.8	90
−78.2	80
−82.0	70
−84.5E	63
−78.5	60
−60.1	50
−46.1	40
−34.1	30
−23.7	20
−14.7	10
− 6.2	0

C_4H_5N
Pyrrole

437. (147)
B = $C_{19}H_{16}$
Triphenylmethane

°C	Wt. % A
AB	
24.6	91.9
29.0	89.6
31.5	87.9
AB + B	
33U	*ca.*87
B	
36.8	84.2
42.7	79.1
46.9	74.1
53.2	67.2
60.0	58.2
60.8	57.7
63.9	52.6
65.6	49.1
68.5	44.4
71.1	40.2
80.1	25.2
86.2	13.9

437.—(*Continued*)

°C	Wt. % A
B	
89.2	8.2
(92.0	0)

C_4H_5N
Vinylacetonitrile

438.1. (291)
B = C_6H_7N
Aniline

°C	Wt. % A
−86.5	100
−89.2	90
−92.7	80
−94.6	74.5
−86.5	70
−71.0	60
−57.8	50
−45.7	40
−34.1	30
−23.7	20
−14.7	10
− 6.2	0

$C_4H_5NO_2$
Succinimide

439. (233)
B = $C_6H_3N_3O_7$
Picric acid

°C	Wt. % A
123.0	100
A + B	
79.0E	33.5
B	
121.0	0

440. (233)
B = $C_6H_4N_2O_5$
2, 4-Dinitrophenol

°C	Wt. % A
A	
123.0	100
A + B	
85.0E	31.0
B	
111.0	0

441. (233)
B = $C_6H_5NO_3$
o-Nitrophenol

°C	Wt. % A
A	
123	100
A + B	
42.5E	6.0
B	
44.5	0

442. (233)
B = $C_6H_5NO_3$
m-Nitrophenol

°C	Wt. % A
A	
123.0	100
A + B	
35.0E	37.0
B	
95.0	0

443. (233)
B = $C_6H_5NO_3$
p-Nitrophenol

°C	Wt. % A
A	
123.0	100

443.—(*Continued*)

°C	Wt. % A
A + AB	
61.0U	45.0
AB + B	
58.5E	33.0
B	
114.5	0

444. (233)
B = C_6H_6O
Phenol

°C	Wt. % A
A	
123.0	100
A + A_2B	
59.0U	50.0
A_2B + B	
27.0E	14.0
B	
41.5	0

445. (233)
B = $C_6H_6O_2$
Catechol

°C	Wt. % A
A	
123.0	100
A + AB	
77.0E	63.0
AB	
84.2	**47.3**
AB + B	
73.0E	32.0
B	
104.0	0

446. (233)
B = $C_6H_6O_2$
Resorcinol

°C	Wt. % A
A	
123.0	100
A + AB	
95.8E	79.0
AB	
122.0	**47.3**
AB + B	
98.0E	18.0
B	
115.0	0

447. (233)
B = $C_6H_6O_2$
Hydroquinol

°C	Wt. % A
A	
123.0	100
A + AB	
107.0E	77.0
AB	
139.0	**47.3**
AB + B	
135.0E	36
B	
169.0	0

448. (233)
B = $C_6H_6O_3$
Pyrogallol

°C	Wt. % A
A	
123.0	100
A + AB	
95.0E	74.0

$C_4H_5NO_2$.—(*Continued*)

448.—(*Continued*)

°C	Wt. % A
AB	
128.0	**44.0**
AB + B	
104.0E	13.0
B	
130.0	0

449. (233)
B = $C_{10}H_8O$
α-Naphthol

A	
123.0	100
A + B	
57.0E	29.0
B	
95.0	0

450. (233)
B = $C_{10}H_8O$
β-Naphthol

A	
123.0	100
A + AB	
85.5E	53.0
AB	
87.5	**40.7**
AB + B	
72.5E	35.0
B	
121.0	0

451. (233)
B = $C_{10}H_8O_2$
1, 4-Dihydroxy-naphthalene

A	
123.0	100
A + A_2B	
114.0E	86.0
A_2B	
133.5	**55.3**
A_2B + B	
126.0E	43.0
B	
183.0	0

452. (233)
B = $C_{10}H_8O_2$
1, 6-Dihydroxy-naphthalene

A	
123.0	100
A + AB	
87.5E	80.0
AB	
127.0	**34.3**
AB + B	
107.0E	19.0
B	
134.0	0

453. (233)
B = $C_{10}H_8O_2$
2, 3-Dihydroxy-naphthalene

453.—(*Continued*)

°C	Wt. % A
A	
123.0	100
A + AB	
108.5E	86.0
AB	
149.5	**34.3**
AB + B	
140.0E	24.0
B	
162.0	0

454. (233)
B = $C_{10}H_8O_2$
2, 6-Dihydroxy-naphthalene

A	
123.0	100
A + A_2B	
116.5E	94.0
A_2B + B	
140U	60
B	
216	0

v. also 317

C_4H_5NS

Allyl isothiocyanate

455. (284)
B = C_6H_7N
Aniline

°C	Mol % B
AB	
34.5	10
58.5	20
71.5	30
82.5	40
98.5	**50**
78.0	60
58.0	70
+46.5	80
AB + B	
−20.0E	90
B	
−13.0	95
− 6.2	100

$C_4H_6O_2$

α-Crotonic acid

456. (342)
B = $C_4H_6O_2$
β-Crotonic acid

°C	Mol % A
A	
+71.96	100
A + B	
− 0.5E	26.5
B	
+14.96	0

457. (208)
B = $C_7H_8O_2$
Dimethylpyrone

A	
71	100
67.1	95

457.—(*Continued*)

°C	Mol % A
A	
63.0	90
58.2	85
51.7	80
A + AB	
37.0E	73
AB	
41.7	75
40.8	70
46.0	65
AB + B	
50.5U	58
B	
60.9	55
75.3	50
86.8	45
95.9	40
103.6	35
110.1	30
115.5	25
119.8	20
123.8	15
127.0	10
132.1	0

v. also 118, 176, 190

$C_4H_6O_3$

Acetic anhydride

458. (255)
B = C_7H_7NO
Benzamide

126.5	0
115.5	10
108.0	20
102.0	30
97.0	40
90.0	50
84.0	60
74.0	70
55.0	80
24.0	90

v. also 266, 294

$C_4H_6O_4$

Succinic acid

458.1. (274.1)
B = $C_6H_3N_3O_7$
Picric acid

°C	Wt. % A
A	
183.0	100
A + B	
121.0E	*ca.* 0
B	
121.5	0

458.2. (274.1)
B = $C_6H_4N_2O_5$
2, 4-Dinitrophenol

A	
183.0	100
A + B	
111.0E	1
B	
112.0	0

458.3. (274.1)
B = $C_6H_5NO_3$
m-Nitrophenol

°C	Wt. % A
A	
183.0	100
A + B	
91.5E	4.0
B	
95.0	0

458.4. (274.1)
B = $C_6H_5NO_3$
p-Nitrophenol

A	
183.0	100
A + B	
107.0E	4.5
B	
114.5	0

458.5. (274.1)
B = C_6H_6O
Phenol

A	
183.0	100
A + B	
36.0E	1.5
B	
41.0	0

458.6. (274.1)
B = $C_6H_6O_2$
Catechol

A	
183.0	100
A + B	
94.0E	13.5
B	
104.0	0

458.7. (274.1)
B = $C_6H_6O_2$
Resorcinol

A	
183	100
A + B	
100.0E	12.5
B	
115.0	0

458.8. (274.1)
B = $C_6H_6O_2$
Hydroquinol

A	
183	100
A + B	
128.0E	41.0
B	
169.5	0

458.81. (274.1)
B = $C_6H_6O_3$
Pyrogallol

A	
183.0	100
A + B	
110.0E	11.0
B	
130.0	0

458.9. (274.1)
B = $C_{10}H_8O$
α-Naphthol

°C	Wt. % A
A	
183.0	100
A + B	
90.5E	2.0
B	
96.0	0

458.91. (274.1)
B = $C_{10}H_8O$
β-Naphthol

A	
183.0	100
A + B	
117.0E	2.5
B	
121.5	0

$C_4H_6O_4$

Dimethyl oxalate

459. (274.1)
B = $C_6H_3N_3O_7$
Picric acid

A	
54.0	100
A + B	
38.0E	56
B	
121.5	0

459.1. (274.1)
B = $C_6H_4N_2O_5$
2, 4-Dinitrophenol

A	
54.0	100
A + B	
43.0E	72
B	
112.5	0

459.2 (274.1)
B = $C_6H_5NO_3$
o-Nitrophenol

A	
54.0	100
A + B	
26.0E	37
B	
44.5	0

459.3. (274.1)
B = $C_6H_5NO_3$
m-Nitrophenol

A	
54.0	100
A + B	
24.0E	54
B	
95.0	0

459.4. (274.1)
B = $C_6H_5NO_3$
p-Nitrophenol

A	
54.0	100
A + B	
32.0E	59.0

459.4.—(*Continued*)

°C	Wt. % A
B	
114.5	0

459.5. (274.1)
B = C_6H_6O
Phenol

A	
54.0	100
A + AB_4	
28.0E	64
AB_4	
47.5	**23.8**
AB_4 + B	
32.0E	8
B	
41.5	0

459.6. (274.1)
B = $C_6H_6O_2$
Catechol

A	
54.0	100
A + B	
30.0E	61
B	
103.5	0

459.7. (274.1)
B = $C_6H_6O_2$
Resorcinol

A	
54.0	100
A + B	
28.0E	57
B	
115.0	0

459.71. (274.1)
B = $C_6H_6O_2$
Hydroquinol

A	
54.0	100
A + A_4B	
49.5E	96.5
A_4B	
94.0	**81.1**
A_4B + B	
91.0E	75.5
B	
169.0	0

459.8. (274.1)
B = $C_6H_6O_3$
Pyrogallol

A	
54.0	100
A + B	
35.0E	67
B	
130.5	0

459.81. (274.1)
B = C_7H_9N
p-Toluidine

A	
54.0	100
A + B	
20.0E	41 5

459.81.—(*Cont'd*)

°C	Wt. % A
B	
44.0	0

459.9. (274.1)
B = $C_{10}H_8O$
α-Naphthol

A	
54.0	100
A + B	
26.0E	59
B	
95.0	0

459.91. (274.1)
B = $C_{10}H_8O$
β-Naphthol

A	
54.0	100
A + B	
39.0E	69
B	
121.0	0

v. also 119, 191, 267

$C_4H_6O_6$

d-Tartaric acid
460. (72)
B = $C_4H_6O_6$
l-Tartaric acid

°C	Mol % A
A	
167.0	100
A + AB	
165E	97
AB	
171.8	90
181.3	80
190.1	70
197.9	60
203.8	**50**
197.9	40
190.1	30
181.3	20
171.8	10
AB + B	
165.0E	3
B	
167.0	0

461.
B = $C_4H_{10}O$
Ethyl ether
v. Seidell, p. 711

$C_4H_7NO_4$

d-Aminosuccinic acid
462. (72)
B = $C_4H_7NO_4$
l-Aminosuccinic acid

A	
149.0	100
147.3	95
A + AB	
145.5E	90

462.—(*Continued*)

°C	Mol % A
AB	
146.3	80
147.1	70
147.7	60
148.1	**50**
147.7	40
147.1	30
146.3	20
AB + B	
145.5E	10
B	
147.3	5
149.0	0

$C_4H_8Cl_2S$

β, β-Dichlorodiethyl sulfide
463. (79)
B = $C_6H_{12}Cl_2$
Dichlorohexane

°C	Wt. % A
13.9	100
10.5	90
7.2	80
3.8	70
0.5	60

464. (79)
B = $C_6H_{12}Cl_2S$
Dichlorodipropyl sulfide

13.9	100
10.5	90
7.2	80
3.8	70
0.5	60

v. also 6

$C_4H_8O_2$

Butyric acid
465.
B = $C_6H_4N_2O_4$
m-Dinitrobenzene
v. Seidell, p. 131

465.1. (452)
B = $C_{10}H_8$
Naphthalene

°C	Mol % B
0.0	7.1
10.0	9.4
20.0	12.6
30.0	17.2
40.0	23.7
50.0	33.3
60.0	47.5
70.0	68.1

v. also 66

$C_4H_8O_2$

Isobutyric acid
465.2. (452)
B = $C_{10}H_8$
Naphthalene

0.0	6.3
10.0	8.7

465.2.—(*Continued*)

°C	Mol % B
20.0	11.5
30.0	16.0

$C_4H_8O_2$

Ethyl acetate
466. (341.5)
B = $C_6H_4N_2O_4$
m-Dinitrobenzene

0	10.25
10	13.0
25	18.95
35	24.62

467. (482)
B = C_6H_7N
Aniline

°C	Mol % A
A	
−83.6	100
−86.8	94.8
−92.7	85.6
AB	
−93.7	78.5
−59.0	53.4
−47.0	47.7
A_2B_3	
−45.4	44.1
−40.5	42.0
−39.9	39.7
AB_3	
−37.9	33.8
−30.4	30.7
−27.6	29.2
−27.0	26.8
B	
−23.7	22.2
−14.9	11.1
− 6.9	0

467.1. (316)
B = $C_7H_6O_3$
Salicylic acid

°C	g B per 100 g A
25.0	38.0

468. *v.* p. 174
B = $C_{10}H_8$
Naphthalene

468.1. (71.1)
B = $C_{10}H_{14}O$
Thymol

°C	g B per 100 g A
1.0	219.0
25.0	412.0

469. *v.* p. 174
B = $C_{14}H_{10}$
Anthracene

470. *v.* p. 174
B = $C_{14}H_{10}$
Phenanthrene

v. also 120, 268

$C_4H_9NO_2$

Methylurethane
470.05 (413)
B = $C_{10}H_{20}O$
Menthol

°C	Mol % A
A	
54.0	100
51.25	94.22
50.2	90.98
49.15	85.38
48.4	80.37
47.7	73.97
46.6	65.91
45.2	57.49
42.9	45.40
40.15	36.96
35.15	25.39
A + B	
32.15E	20.0
B	
35.95	13.40
36.75	9.80
40.15	3.30
42.0	0.0

$C_4H_{10}O$

Butyl alcohol
470.1. (475)
B = $C_{10}H_8$
Naphthalene

°C	Mol % B
0.0	2.75
10.0	3.8
20.0	5.2
30.0	7.4
40.0	11.5
50.0	18.7
60.0	34.0
70.0	69.0

470.2. (475)
B = $C_{10}H_9N$
β-Naphthylamine

°C	Mol % A
28.0	97.5
46.5	95
62.5	90
75.5	80
81.5	70
85.6	60
89.0	50
93.5	40
110.6	0

471. (345)
B = $C_{12}H_{10}$
Acenaphthene

°C	Mol % B
0.0	0.77
10.0	1.11
20.0	1.61
30.0	2.40
40.0	3.63
50.0	5.62
60.0	9.0
70.0	16.2
80.0	32.0

$C_4H_{10}O$

Isobutyl alcohol
472. (419)
B = $C_6H_4Br_2$
p-Dibromobenzene

°C	Mol % B
30	5.3
40	7.7
50	11.5
60	19.4
70	43.0
75	63.0
80	84.4
87	100.0

473.
B = $C_{12}H_{24}O_2$
Lauric acid
v. Seidell, p. 349

474.
B = $C_{14}H_{28}O_2$
Myristic acid
v. Seidell, p. 443

475.
B = $C_{16}H_{32}O_2$
Palmitic acid
v. Seidell, p. 474

v. also 71

$C_4H_{10}O$

Trimethyl carbinol
476. (251)
B = $C_6H_4N_2O_5$
2, 4-Dinitrophenol

°C	Wt. % A
A	
24.0	100
A + AB	
20.0	97
AB	
89.0	**29.0**
AB + B	
85.0E	17.0
B	
111.0	0

477. (251)
B = $C_6H_5NO_3$
o-Nitrophenol

A	
24.0	100
A + A_2B	
11.0E	90
A_2B	
36.0	**51.6**
A_2B + B	
31.0E	42.0
B	
45.0	0

478. (251)
B = $C_6H_5NO_3$
m-Nitrophenol

A	
24.0	100
A + A_2B	
1.0E	80

478.—(*Continued*)

°C	Wt. % A
A_2B	
34.5	**51.6**
A_2B + B	
28.0E	43.0
B	
95.0	0

479. (251)
B = $C_6H_5NO_3$
p-Nitrophenol

A	
24.0	100
A + A_2B	
7.0	82.0
A_2B	
37.5	**51.6**
A_2B + B	
28.0	40
B	
114.0	0

480. (375, 377)
B = C_6H_6O
Phenol

A	
24.95	100.00
19.7	94.51
15.86	91.04
11.25	87.38
A + A_2B	
8.14E	84.5
A_2B	
13.66	79.72
18.85	73.72
20.6	70.78
22.6	65.83
23.11	61.89
38.9	**61.1**
22.54	57.22
21.6	53.89
18.17	48.51
15.41	45.82
13.1	43.71
7.54	39.44
A_2B + AB_2	
4.48E	37.86
AB_2	
15.56	30.0
15.75	**27.27**
15.12	24.56
14.04	22.15
AB_2 + B	
8.5E	20.5
B	
12.24	19.22
40.87	0

481. (270)
B = $C_6H_6O_2$
Catechol

A	
23.0	100
A + A_2B	
9.5E	85.5
A_2B	
29.0	**57.3**

$C_4H_{10}O$.—(*Continued*)

481.—(*Continued*)

°C	Wt. % A
$A_2B + AB_2$	
24.5	50.0
AB_2	
69.7	**25.2**
$AB_2 + B$	
69.0E	23.0
B	
103.0	0

482. [270] B = $C_6H_6O_2$ Resorcinol

°C	Wt. % A
A	
22.0	100
A + A_2B	
9.0E	89.0
A_2B	
47.3	**57.3**
A_2B + AB	
43.5E	47.5
AB	
45.8	**40.2**
AB + B	
45.5E	39.0
B	
109.0	0

483. [270] B = $C_6H_6O_2$ Hydroquinol

°C	Wt. % A
A	
23.0	100
A + A_xB_y	
22.0E	97.0
?	
72.0–167.0	78.2–28.4
B	
171.0	0

484. [270] B = $C_6H_6O_3$ Pyrogallol

°C	Wt. % A
A	
23.0	100
A + A_2B	
16.0E	94.5
A_2B	
56.2	**54**
A_2B + B	
54.2E	49.5
B	
126.0	0

485. [270] B = $C_6H_8N_2$ *o*-Phenylenediamine

°C	Wt. % A
A	
23.0	100
A + B	
21.0E	97.0
B	
101.1	0.0

486. [270] B = $C_6H_8N_2$ *m*-Phenylenediamine

°C	Wt. % A
A	
23.0	100
A + B	
21.3	93.5
B	
60.5	0

487. [375] B = C_7H_7Br *p*-Bromotoluene

°C	Wt. % A
A	
23.52	100
A + B	
8.76E	61.15
B	
26.74	0

488. [270] B = C_7H_9N *p*-Toluidine

°C	Wt. % A
A	
23.1	100
A + B	
5.1E	69.5
B	
43.5	0

489. [377] B = C_8H_{10} *p*-Xylene

°C	Wt. % A
A	
18.79	100.00
9.88	87.94
+4.21	77.77
−0.61	67.99
A + B	
−1.80E	64.46
B	
−0.97	60.00
+1.74	51.65
4.33	40.99
6.27	32.63
8.76	19.42
10.71	8.64
13.18	0.00

490. [251] B = $C_{10}H_8$ Naphthalene

°C	Wt. % A
A	
24.2	100
A + B	
19.0E	95.0
B	
80.3	0

491. [270] B = $C_{10}H_8O$ α-Naphthol

°C	Wt. % A
A	
+23.0	100
A + A_2B	
−11.5E	62.5

491.—(*Continued*)

°C	Wt. % A
A_2B	
+ 1.0	**50.5**
A_2B + B	
− 3.0E	44.0
B	
+92.5	0

492. [270] B = $C_{10}H_8O$ β-Naphthol

°C	Wt. % A
A	
23.0	100.0
A + A_2B	
4.0E	78.0
A_2B	
24.0	**50.5**
A_2B + B	
23.0E	52.0
B	
122.0	0.0

493. [270] B = $C_{10}H_9N$ α-Naphthylamine

°C	Wt. % A
A	
23.0	100.0
A + A_6B	
15.0E	85.0
A_6B	
16.0	**75.6**
$A_6B + A_2B$	
14.0E	63.0
A_2B	
24.1	**50.8**
$A_2B + AB_2$	
21.0E	45.0
AB_2	
29.5	**23.1**
AB_2 + B	
28.5E	9.0
B	
48.1	0.0

494. [270] B = $C_{10}H_9N$ β-Naphthylamine

°C	Wt. % A
A	
23.0	100
A + A_2B	
18.0E	96
$A_2B + AB_2$	
70.0U	71
$A_2B + AB_2$	
75.5mU	55
A_2B	
92.0	*ca.* **50.0**
$A_2B + AB_2$	
90.0E	47.0
AB_2	
95.5	**23.1**
AB_2 + B	
95.5E *ca.*	22.0
B	
109.0	0

495. [375] B = $C_{10}H_{14}O$ Thymol

°C	Wt. % A
A	
24.97	100.00
17.87	89.58
+ 6.74	79.74
−12.82	69.9
No solid phase	
B	
− 3.72	27.87
+18.84	20.02
37.71	9.46
49.12	0.00

$C_4H_{10}O$

Ethyl ether

496. *v.* p. 174 B = $C_6H_4Br_2$ *p*-Dibromobenzene

497. [71] B = $C_6H_5NO_3$ *o*-Nitrophenol

°C	Wt. % A
44.0	0
40.6	5
37.5	10
31.7	20
27.1	30
23.0	40
18.6	50
12.7	60
4.0	70

498. [71] B = $C_6H_5NO_3$ *m*-Nitrophenol

°C	Wt. % A
95.2	0
89.0	5
83.0	10
70.0	20
53.5	30
+27.5	40
− 7.0	50

499. [71] B = $C_6H_5NO_3$ *p*-Nitrophenol

°C	Wt. % A
114.0	0
106.3	5
101.0	10
89.2	20
67.5	30
38.3	40

500. [385] B = C_6H_6

°C	Mol % A
+ 5.5	0
− 1.3	10
− 8.2	20
−15.8	30
−24.5	40
−34.3	50
−45.5	60
−58.5	70
−74.0	80

501. [443] B = $C_7H_5N_5O_8$ Trinitrophenylmethylnitroamine (Tetryl)

°C	g B per 100 g A
0	0.188
10	0.330
20	0.418
30	0.493

501.1. [71.1] B = $C_7H_6O_2$ Benzoic acid

°C	Wt. % A
0.0	23.3
25.0	40.8

502. B = $C_8H_{10}N_4O_2$ Caffeine *v.* Seidell, p. 186

503. *v.* p. 174 B = $C_{10}H_8$ Naphthalene

504. *v.* p. 174 B = $C_{14}H_8O_2$ Anthraquinone

505. *v.* p. 174 B = $C_{14}H_{10}$ Phenanthrene

v. also 20, 42, 260, 269, 291, 422, 425, 461

$C_4H_{11}N$

Diethylamine

506. [385] B = C_6H_6

°C	Wt. % A
A	
−49.3	100.00
−50.0	93.90
−52.4	82.10
A + B	
−54.5E	76.41
B	
−50.3	70.84
−41.51	60.06
−32.0	49.74
−24.2	39.85
−16.01	30.36
− 8.91	21.25
− 3.44	12.54
+ 5.44	0.00

C_5BrCl_5O

Pentachloromonobromo-α-keto-γ-R-pentene

507. [287] B = C_5Cl_6O Hexachloro-α-keto-γ-R-pentene

°C	Mol % A
A	
97.91	100

507.—(*Continued*)

°C	Mol % A
Mix.	
(?)	(?)
B	
87.5	0

C_5H_5N

Pyridine

508. [53] B = C_6H_5ClO *o*-Chlorophenol

°C	Mol % A
A	
−40.7	100
−44.5	95
−49.0	90
−59.5	80
A + AB	
−63.0E	76.9
AB	
−45.0	70
−28.0	60
−21.6	**50**
−28.0	40
AB + B	
−36.9E	33.9
B	
−30.0	30
−14.0	20
− 7.0	15
− 0.5	10
+ 4.3	5
8.0	0

509. *v.* p. 174 B = C_6H_6

510. [53, 151] B = C_6H_6O Phenol

°C	Mol % A
A	
−39.0	100
−42.7	95
−47.0	90
A + AB	
−57.0E	82
AB	
−28.0	70
−14.7	60
− 9.5	**50**
AB + AB_2	
−11.0E	46.4
AB_2	
0.0	40
3.5	**33.3**
+ 3.0	30
AB_2 + B	
− 2.0E	23
B	
+ 7.0	20
19.5	15
29.5	10
36.5	5
40.5	0

511. (9)
B = $C_7H_6O_2$
Benzoic acid

°C	Mol % A
A	
−38.0	100
A + AB	
−42.2E	95
AB	
+43.7	**50**
AB + B	
42.8E	45.6
B	
(121.5	0)

512. (53, 151)
B = C_7H_8O
o-Cresol

°C	Mol % A
A	
−39.0	100
−42.7	95
A + AB	
−49.5E	87.5
AB	
−30.0	80
−11.5	70
− 1.7	60
+ 1.3	**50**
− 7.0	40
AB + B	
−34.0E	31.8
B	
+ 9.5	20
16.8	15
22.0	10
26.0	5
29.7	0

513. (53)
B = C_7H_8O
m-Cresol

°C	Mol % A
−39.0	100
−42.7	95
−47.0	90
−57.0	80
−68.0	70
−74.5	64.9
−74.5 to −38.3	vis.
−38.3	24.5
−25.0	20
−13.0	15
− 5.0	10
+ 0.5	5
4.5	0

514. (53, 151)
B = C_7H_8O
p-Cresol

°C	Mol % A
A	
−39.0	100
−42.7	95
A + AB	
−49.0E	88
AB	
−30.5	80
−13.5	70

514.—(*Continued*)

°C	Mol % A
AB	
− 2.5	60
+ 1.5	**50**
AB + AB_2	
− 1.5E	45
AB_2	
+ 4.0	**33**
AB_2 + B	
− 1.5E	22
B	
+ 13.5	15
22.3	10
29.0	5
33.5	0

515. (269)
B = $C_8H_{10}N_2O$
Nitrosodimethylaniline

°C	Wt. % A
A_4B	
−10.0	83.8
+ 4.3	**67.7**
A_4B + B	
0.5E	64
B	
83.5	0

516. *v.* p. 174
B = $C_{10}H_8$
Naphthalene

517. (475)
B = $C_{12}H_9N$
Carbazole

°C	g B per 100 g A
20.0	16.0
30.0	18.0
40.0	21.3
50.0	24.5
60.0	28.2
70.0	32.5
80.0	37.5
100.0	48.8

518. *v.* p. 174
B = $C_{12}H_{10}$
Acenaphthene

519. *v.* p. 174
B = $C_{13}H_{10}$
Fluorene

520. *v.* p. 174
B = $C_{14}H_8O_2$
Anthraquinone

521. (475)
B = $C_{14}H_{10}$
Anthracene

°C	g B per 100 g A
20.0	2.0
30.0	2.8
40.0	3.8
50.0	5.4
60.0	7.2
70.0	9.6

521.—(*Continued*)

°C	g B per 100 g A
80.0	12.8
90.0	17.2
100.0	23.4

522. *v.* p. 174
B = $C_{14}H_{10}$
Phenanthrene

523.
B = $C_{19}H_{16}$
Triphenylmethane
v. Seidell, p. 434

$C_5H_8O_4$
Dimethyl malonate
v. 121

$C_5H_{10}O_2$
Valeric acid

523.2. (452)
B = $C_{10}H_8$
Naphthalene

°C	Mol % B
0.0	5.4
10.0	8.0
20.0	11.6
30.0	16.7
40.0	23.6
50.0	33.0
60.0	47.0
70.0	68.0

$C_5H_{11}N$
Piperidine
524. *v.* p. 174
B = C_6H_{12}
Cyclohexane

$C_5H_{11}NO_2$
Betaine
v. 86, 318

$C_5H_{12}O$
n-Amyl alcohol
v. 390

$C_5H_{12}O$
Isoamyl alcohol
v. 72

$C_6H_2ClN_3O_6$
Picryl chloride
525. (119)
B = $C_6H_3ClN_2O_4$
1-Chloro-2, 4-dinitrobenzene

°C	Wt. % A
A	
80.6	100
72.8	90
64.7	80
55.4	70
44.2	60
30.7	50
A + B	
25.0E	46

525.—(*Continued*)

°C	Wt. % A
B	
28.7	40
34.3	30
39.5	20
44.0	10
47.9	0

526. (104, 106)
B = $C_6H_3N_3O_7$
Picric acid

A	
81.2	100
74.5	90
67.1	80
A + B	
57.5E	69
B	
74.6	60
88.0	50
96.7	40
103.6	30
109.6	20
115.6	10
122.4	0

527. (104, 106)
B = $C_{10}H_8$
Naphthalene

A	
81.2	100
A + AB	
63.5E	91.6
AB	
91.2	**65.9**
AB + B	
66.5E	28.6
B	
80.0	0

528. (104, 106)
B = $C_{12}H_8$
Acenaphthylene

A	
81.2	100
A + AB	
67.8E	93.2
AB	
109.4	**61.9**
AB + B	
78.1E	26.8
B	
93.0	0

529. (104, 106)
B = $C_{12}H_{10}$
Acenaphthene

A	
81.2	100
A + AB	
66.2E	91.5
AB	
113.2	**61.6**
AB + B	
79.8E	27.3
B	
96.2	0

530. (104, 106)
B = $C_{13}H_{10}$
Fluorene

°C	Wt. % A
A	
81.2	100
A + AB	
50.0E	84.8
AB	
64.6	**39.8**
AB + B	
60.9E	52.5
B	
112.3	0

531. (104, 106)
B = $C_{14}H_{10}$
Anthracene

A	
81.2	100
A + AB	
62.6E	84.1
AB + B	
141.6U	63.0
B	
213	0

532. (104, 106)
B = $C_{14}H_{10}$
Phenanthrene

A	
81.2	100
A + AB	
57.9E	83.2
AB	
82.4	**58.1**
AB + B	
63.5E	42.3
B	
99.0	0

533. (104, 106)
B = $C_{18}H_{18}$
Retene

A	
81.2	100
A + AB	
45.5E	71.2
AB	
53.5	**51.3**
AB + B	
47.5E	34.2
B	
95.2	0

$C_6H_2Cl_2N_2O_4$
1, 4-Dichloro-2, 3-dinitrobenzene
534. (359)
B = $C_6H_2Cl_2N_2O_4$
1, 4-Dichloro-2, 6-dinitrobenzene

A	
101.2	100
A + B	
72.0E	61.0
B	
106.0	0

$C_6H_2Cl_2N_2O_4$
1, 4-Dichloro-2, 5-dinitrobenzene
535. (309)
B = $C_6H_2Cl_2N_2O_4$
1, 4-Dichloro-2, 6-dinitrobenzene

°C	Wt. % A
A	
117.1	100
A + A_2B_3	
80E *ca.*	46
A_2B_3	
81.2?	**40**
A_2B_3 + B	
ca. 81.0E	40
B	
104.9	0

$C_6H_3BrClNO_2$
1-Bromo-4-chloro-2-nitrobenzene
536. (174)
B = $C_6H_3BrClNO_2$
1-Bromo-4-chloro-3-nitrobenzene
Mix.

67.4	100
66.5†	65.0
69.7	0

$C_6H_3Br_2NO_2$
1, 2-Dibromo-3-nitrobenzene
537. (168)
B = $C_6H_3Br_2NO_2$
1, 2-Dibromo-4-nitrobenzene

A	
100.0	84.0
A + B	
30.5E	
B	
36.0	34.6
24.2	40.0
15.6	45.2
13.1	47.2
8.2	50.8
4.2	53.8
0.0	56.8

$C_6H_3Br_2NO_2$
1, 3-Dibromo-2-nitrobenzene
538. (167)
B = $C_6H_3Br_2NO_2$
1, 3-Dibromo-4-nitrobenzene

A	
82.6	100.0
B	
56.2	8.76
57.4	6.16
59.1	2.74
60.45	0.0

$C_6H_3Br_3O$
Tribromophenol

539. (289)
B = $C_6H_3Cl_3O$
Trichlorophenol

°C	Mol % A
A	
50.0	100
45.0	90
40.4	80
36.5	70
32.3	60
27.6	50
22.75	40
A + B	
18.4E	30.8
B	
20.4	20
22.75	10
25.37	0

540. (439)
B = $C_6H_3N_3O_6$
1, 3, 5-Trinitrobenzene

A	
92.5	100.0
A + B	
76.5E	65.0
B	
122.0	0.0

541. (42)
B = $C_8H_5Br_3O_2$
Acetyltribromophenol

A	
92.5	100.0
A + AB	
58.0E	65.5
AB	
65 *ca.*	**50.0**
AB + B	
57.5E	32.0
B	
82.0	0.0

$C_6H_3ClN_2O_4$
1-Chloro-2, 4-dinitrobenzene

542. (139)
B = $C_6H_6N_2O_2$
o-Nitroaniline

°C	Wt. % A
A	
51.0	100
A + AB	
31.0E	78.0
AB	
35.0	**59.4**
AB + B	
33.5E	55.0
B	
68.2	0

543. (139)
B = $C_6H_6N_2O_2$
m-Nitroaniline

543.—(*Continued*)

°C	Wt. % A
A	
51.0	100.0
A + B	
34.3E	48.0
B	
111.5	0.0

544. (139)
B = C_8H_9NO
p-Aminoacetophenone

°C	Mol % A
A	
51.0	100
AB_2	
66 *ca.*	**33**
B	
104.8	0

545. (139)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Wt. % A
A	
51.0	100
A + AB	
38.0E	78.0
AB	
71.5	**58.6**
AB + B	
34.0E	23.0
B	
48.3	0

v. also 525

$C_6H_3Cl_2NO_2$
1, 2-Dichloro-3-nitrobenzene

546. (165)
B = $C_6H_3Cl_2NO_2$
1, 2-Dichloro-4-nitrobenzene

A	
59.9	100.00
B	
32.8	12.76
35.9	7.63
40.5	0.00

$C_6H_3Cl_2NO_2$
1, 3-Dichloro-2-nitrobenzene

547. (165)
B = $C_6H_3Cl_2NO_2$
1, 3-Dichloro-4-nitrobenzene

A	
70.05	100.0
B	
25.49	10.48
27.95	5.37
30.45	0.00

$C_6H_3Cl_2NO_2$
1, 3-Dichloro-4-nitrobenzene

548. (165)
B = $C_6H_3Cl_2NO_2$
1, 3-Dichloro-5-nitrobenzene

°C	Wt. % A
A	
30.45	100.00
29.03	96.94
27.80	94.34
26.57	91.93
B	
63.15	0.00

v. also 547

$C_6H_3Cl_3$
1, 2, 3-Trichlorobenzene

549.
B = $C_6H_3Cl_3$
1, 2, 4-Trichlorobenzene, *v.* 1853

550.
B = $C_6H_3Cl_3$
1, 3, 5-Trichlorobenzene, *v.* 1853

$C_6H_3Cl_3$
1, 2, 4-Trichlorobenzene

551.
B = $C_6H_3Cl_3$
1, 3, 5-Trichlorobenzene
v. 549, 1853

$C_6H_3Cl_3O$
Trichlorophenol
v. 539

$C_6H_3FN_2O_4$
1-Fluoro-2, 4-dinitrobenzene

552. (166)
B = $C_6H_4FNO_2$
p-Fluoronitrobenzene

°C	Mol % A
A	
24.3	100.0
B	
21.0	9.0
23.0	6.0
24.7	3.0
26.4	0.0

$C_6H_3N_3O_6$
1, 3, 5-Trinitrobenzene

553. (43)
B = $C_6H_3N_3O_7$
Picric acid

553.—(*Continued*)

°C	Wt. % A
Mix.	
120.3	100
114.0	90
113.5† *ca.*	86
114.0	80
116.1	70
117.0	60
118.0	50
119.0	40
119.6	30
120.3	20
120.6	10
122.3	0

554. (110)
B = $C_6H_3N_3O_8$
Styphnic acid

A	
121.4	100.0
A + B	
83.2E	64.0
B	
175.5	0.0

555. *v.* p. 174
B = $C_6H_4N_2O_4$
o-Dinitrobenzene

556. *v.* p. 174
B = $C_6H_4N_2O_4$
m-Dinitrobenzene

557. (438)
B = $C_6H_6N_2O_2$
m-Nitroaniline

°C	Mol % A
A	
122.0	100.0
A + AB	
91.0E	66.0
AB	
96.6	**50.0**
AB + B	
90.3E	30.5
B	
113.5	0.0

558. (438)
B = $C_6H_6N_2O_2$
p-Nitroaniline

A	
122.0	100.0
A + AB	
89.0E	64.0
AB	
91.4U	55.0
B	
146.2	0.0

559. (439)
B = $C_6H_6O_2$
Hydroquinol

559.—(*Continued*)

°C	Mol % A
A	
122.0	100.0
A + AB	
101.0E	79.0
AB	
131.0	**50.0**
AB + B	
128.0E	43.0
B	
169.0	0.0

560. (222)
B = C_6H_7N
Aniline

A	
122.2	100.0
109.0	86.1
A + AB	
101E	82
AB	
110.0	75.6
123.0	61.0
125.0	**50.0**
124.0	41.2
121.0	36.0
110.5	25.0
102.0	19.8
88.0	13.8
71.0	9.0
+16.0	2.0
AB + B	
− 6.5E	0.5
B	
− 5.5	0.0

561. (250)
B = $C_6H_8N_2$
o-Phenylenediamine

°C	Wt. % A
A	
122.0	100.0
A + AB	
108.0E	97.0
AB	
163.0	**66.3**
AB + B	
92.0E	7.0
B	
101.0	0.0

562. (250)
B = $C_6H_8N_2$
m-Phenylenediamine

A	
122.0	100.0
A + AB	
105.0E	93.0
AB	
168.0	**66.3**
AB + B	
45.0E	18.0
B	
62.0	0.0

563. (250)
B = $C_6H_8N_2$
p-Phenylenediamine

563.—(*Continued*)

°C	Wt. % A
A	
122.0	100.0
A + AB	
101.5E	91.0
AB	
145.5	**66.3**
AB + B	
106.0E	36.0
B	
140.0	0.0

564. *v.* p. 175
B = $C_7H_5N_3O_6$
Trinitrotoluene

565. *v.* p. 175
B = $C_7H_5N_5O_8$
Trinitrophenyl-methylnitroamine (Tetryl)

566. (439)
B = $C_7H_8O_2$
Dimethylpyrone

°C	Mol % A
A	
122.0	100.0
A + B	
79.0E	57.0
B	
132.0	0.0

567. (439)
B = $C_9H_6O_2$
Coumarin

A	
122.0	100.0
A + AB_2	
41.0E	43.0
AB_2	
44.0	**33.3**
AB_2 + B	
43.0E	25.0
B	
67.5	0.0

568. (222, 283)
B = $C_{10}H_8$
Naphthalene

A	
122.0	100
118.5	95
A + AB	
115.0E	90
AB	
131.8	80
143.0	70
149.1	60
151.1	**50**
149.8	40
143.0	30
129.8	20
101.0	10
AB+B	
77.0E	**5**
B	
80.1	0

569. (438)
B = $C_{10}H_8N_2$
γ, γ-Dipyridyl

A	
122.0	100.0
A + AB	
96.5E	77.0
AB	
111.1	**50.0**

569.—(*Continued*)

°C	Mol % A
AB + B	
91.5E	20.5
B	
112.0	0.0

570. (237)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Wt. % A
A	
121.0	100
171.0	30
155.0	20
125.0	10
AB + B	
47.0E	2
B	
48.0	0

571. (237)
B = $C_{10}H_9N$
β-Naphthylamine

A	
121.0	100
A + AB	
108.0E	91.5
AB	
139.5	80
153.9	70
161.8	**59.8**
156.3	50
144.5	40
126.5	30
AB + B	
98.0E	19
B	
103.5	10
109.0	0

572. (101)
B = $C_{10}H_{16}O$
Camphor

°C	Mol % A
A	
120.7	100.0
A + B	
73.8E	34.7
B	
178.0	0.0

573. (265)
B = $C_{12}H_9N$
Carbazole

°C	Wt. % A
A	
122.0	100
A + AB	
120.0E	97.5
AB	
132.0	95
152.0	90
177.7	80
192.3	70
203.0	**56**
200.0	50
AB + B	
194.5E	45

573.—(*Continued*)

°C	Wt. % A
B	
200.0	40
210.9	30
220.9	20
229.6	10
236.0	0

574. (109, 265)
B = $C_{12}H_{10}$
Acenaphthene

A	
122.0	100
A + AB	
115.0E	94
AB	
128.3	90
148.2	80
156.6	70
161.0	**58**
159.7	50
153.7	40
142.0	30
122.5	20
AB + B	
87.0E	8
B	
90.2	5
95.0	0

575. (439)
B = $C_{12}H_{10}O$
Diphenyl ether

°C	Mol % A
A	
122.0	100.0
A + B	
24.5E	11.0
B	
28.0	0.0

576. (439)
B = $C_{13}H_8O$
Fluorenone

A	
122.0	100.0
A + AB_2	
77.5E	40.0
AB_2	
78.0	**33.3**
AB_2 + B	
68.5	14.0
B	
82.0	0.0

577. (439)
B = $C_{13}H_8O_2$
Xanthone

A	
122.0	100.0
A + B	
93.0E	74.0
B	
173.0	0.0

578. (230)
B = $C_{13}H_{10}$
Fluorene

578.—(*Continued*)

°C	Wt. % A
A	
121.0	100.0
111.3	90
A + A_3B_2	
99.5E	79.0
A_3B_2	
104.7	70
105.0	**65.7**
99.9	50
A_3B_2 + B	
86.0E	36.0
B	
91.0	30
98.8	20
105.7	10
112.5	0

579. (109, 352)
B = $C_{14}H_{10}$
Anthracene

A	
121.5	100
A + AB	
112.0E	95.5
AB	
126.1	90
145.5	80
156.6	70
163.0	60
164.5	**54.5**
AB + B	
162.0E	49
B	
175.8	40
187.6	30
198.2	20
207.0	10
213.0	0

580. (228)
B = $C_{14}H_{10}$
Phenanthrene

A	
121.0	100
116.6	95
111.1	90
A + AB	
105.0E	85
AB	
110.3	80
119.4	70
124.6	60
125.5	**54.5**
125.0	50
120.0	40
110.6	30
AB + B	
86.0E	19.5
B	
96.2	10
103.0	0

581. (109)
B = $C_{18}H_{18}$
Retene

581.—(*Continued*)

°C	Wt. % A
A	
121.4	100.0
A + AB	
93.3E	77.2
AB	
133.0	**47.6**
AB + B	
70.5E	15.7
B	
95.2	0.0

582. (243)
B = $C_{19}H_{16}O$
Triphenyl carbinol

A	
121.5	100.0
A + A_3B_2	
112.0E	85.0
A_3B_2	
134.5	**55.1**
A_3B_2 + B	
133.0E	52.0
B	
159.0	0.0

v. also 540

$C_6H_3N_3O_7$
Picric acid

583. *v.* p. 175
B = $C_6H_4N_2O_4$
m-Dinitrobenzene

584. *v.* p. 175
B = $C_6H_4N_2O_5$
2, 4-Dinitrophenol

585. *v.* p. 175
B = $C_6H_4N_4O_6$
Picramide

586. *v.* p. 175
B = $C_6H_5NO_3$
o-Nitrophenol

587. *v.* p. 175
B = $C_6H_5NO_3$
m-Nitrophenol

588. *v.* p. 175
B = $C_6H_5NO_3$
p-Nitrophenol

589. (278)
B = C_6H_6

°C	Mol % A
A	
122.2	100
115.5	90
107.8	80
100.0	70
92.2	60
84.5	50
78.2	40
70.7	30
61.7	20
46.9	10
A + B	
4.5E	1.35

589.—(*Continued*)

°C	Mol % A
B	
5.5	0

v. also Seidell, p. 493

591. (219, 381)
B = C_6H_6O
Phenol

A	
122.5	100
112.2	90
102.1	80
92.0	70
A + AB	
81.8E	60
AB	
84.0	**50**
82.8	40
78.0	30
70.0	20
52.2	10
AB + B	
36.0E	5.5
B	
40.6	0.0

592. (383)
B = $C_6H_6O_2$
Catechol

A	
120.25	100.0
112.8	90.1
107.3	84.1
A + AB	
104.2E	*ca.* 81.5
AB	
112.9	71.5
119.8	60.5
122.4	**50.0**
120.8	40.5
116.5	31.2
108.8	21.9
AB + B	
96.4E	*ca.* 14
B	
97.8	10.7
103.4	0.0

593. (383)
B = $C_6H_6O_2$
Resorcinol

A	
120.25	100.0
112.6	90.1
105.2	81.6
100.8	76.7
A + AB	
95.15E	*ca.* 70
AB	
96.6	66.3
98.9	59.9
99.8	54.2
100.3	**50.0**
99.65	43.3
97.9	35.8
94.7	28.1
AB + B	
93.7E	*ca.* 25

593.—(*Continued*)

°C	Mol % A
B	
95.8	20.8
102.1	10.9
108.8	0.0

593.1. (444.1)
B = $C_6H_{10}O_4$
Glycol diacetate

°C	g A per 100 g B
25.0	46.3

594. *v.* p. 175
B = $C_7H_5N_3O_6$
Trinitrotoluene

595. (447)
B = $C_7H_5N_5O_8$
Trinitrophenyl-methylnitroamine (Tetryl)

°C	Wt. % A
A	
121.0	100
118.7	95
115.2	90
111.7	85
108.0	80
99.9	70
90.0	60
76.7m	50
A + B	
69.0mE	46
B	
81.0m	40
A + AB	
85.5E	56
AB	
85.5	**44.4**
AB + B	
85.5E	37
B	
98.3	30
112.5	20
117.3	15
121.8	10
125.2	5
128.72	0

596. *v.* p. 175
B = $C_7H_6N_2O_4$
2, 4-Dinitrotoluene

597. (258)
B = $C_7H_6O_2$
m-Hydroxy-benzaldehyde

A	
122.0	100.0
A + AB	
88.0E	73.0
AB	
89.0	**65.2**
AB + B	
88.0E	26.0
B	
105.0	0.0

$C_6H_3N_3O_7$.—(*Continued*)

598. [210] B = C_7H_8O *o*-Cresol

°C	Mol % A
A	
118.5	100
111.3	90
103.2	80
98.8	75
94.0	70
A + AB	
87.0E	63.4
AB	
88.2	60
89.5	55
89.8	**50**
89.4	45
88.6	40
87.1	35
84.9	30
81.6	25
77.1	20
71.1	15
62.6	10
47.0	5
AB + B	
29.4E	1.6
B	
30.4	0

599. [210] B = C_7H_8O *m*-Cresol

°C	Mol % A
A	
118.5	100
111.4	90
103.3	80
98.8	75
94.0	70
88.6	65
83.0	60
76.8	55
70.1	50
A + AB_2	
59.5E	43
AB_2	
60.6	40
61.6	**33.3**
61.2	30
59.6	25
56.9	20
52.9	15
46.8	10
36.5	5
AB_2 + B	
10.2E	1
B	
10.9	0

600. [210] B = C_7H_8O *p*-Cresol

°C	Mol % A
A	
118.5	100
111.3	90
103.2	80
98.7	75
93.8	70
88.4	65
82.8	60
76.1	55
A + AB	
65.5U	48
AB	
64.8	45
62.8	40
60.1	35
56.5	30
52.4	25
47.1	20
40.5	15
33.3	10
AB + B	
29.2E	7.3
B	
34.5	0

601. [208] B = $C_7H_8O_2$ Dimethylpyrone

°C	Mol % A
A	
118.4	100
114.7	95
110.1	90
105.2	85
99.8	80
93.9	75
A + AB	
84.7E	68
AB	
90.1	65
96.2	60
99.7	55
100.8	**50**
99.5	45
95.3	40
86.9	35
AB + B	
80.0E	32
B	
102.3	25
113.4	20
120.8	15
125.6	10
132.1	0

602. [383] B = $C_7H_8O_2$ Guaiacol

°C	Mol % A
A	
120.25	100.0
112.6	90.0
103.2	79.6
95.9	72.0
88.7	66.6
A + AB	
86E	*ca.* 64
AB	
86.45	60.2
87.9	**50.0**
87.1	39.9
83.0	30.3
74.8	20.4
58.85	9.9
41.65	4.4
AB + B	
26.55E	*ca.* 2.0
B	
27.25	1.1
28.1	0.0

603. [249] B = C_8H_8O Acetophenone

°C	Wt. % A
A	
121.0	100.0
A + AB	
50.0U	56.0
AB + B	
16.5E	15.0
B	
20.5	0.0

604. [210] B = $C_8H_8O_2$ Phenylacetic acid

°C	Mol % A
A	
118.5	100
114.2	90
110.1	80
105.8	70
101.6	60
97.3	50
92.6	40
87.3	30
80.0	20
A + B	
70.9E	10
B	
76.6	0

605. [210] B = $C_8H_8O_2$ *o*-Toluic acid

°C	Mol % A
A	
118.5	100
114.3	90
110.0	80
105.7	70
101.3	60
97.0	50
92.6	40
A + B	
88.0E	29.3
B	
92.7	20
97.8	10
103.4	0

606. [210] B = $C_8H_8O_2$ *m*-Toluic acid

°C	Mol % A
A	
118.5	100
113.7	90
109.8	80
105.4	70
101.1	60
96.8	50
92.4	40
A + B	
88.2E	30.5
B	
96.0	20
102.7	10
109.6	0

606.1. [274.1] B = $C_9H_8O_2$ Cinnamic acid

°C	Wt. % A
A	
121.5	100
A + AB	
103.0E	78
AB	
106.5	**60.7**
AB + B	
105.0	50
B	
133.0	0

607. [103] B = $C_{10}H_7Br$ α-Bromonaphthalene

°C	Wt. % A
A	
122.4	100.0
A + AB	
105.6	80.8
AB	
129.6	**52.5**
41.3	2.5

608. [103] B = $C_{10}H_7Br$ β-Bromonaphthalene

°C	Wt. % A
A	
122.4	100
A + AB	
76.2E	66.6
AB	
83.5	**52.5**
AB + B	
50.6E	10.4
B	
58.3	0.0

609. [103] B = $C_{10}H_7Cl$ α-Chloronaphthalene

°C	Wt. % A
A	
122.4	100.0
A + AB	
104.7E	83.7
AB	
125.7	**58.5**
33.4	2.5

610. [103] B = $C_{10}H_7Cl$ β-Chloronaphthalene

°C	Wt. % A
A	
122.4	100.0
A + AB	
79.2	67.3
AB	
81.5	**58.5**
AB + B	
49.5E	17.6
B	
56.7	0.0

611. [103] B = $C_{10}H_7NO_2$ α-Nitronaphthalene

°C	Wt. % A
A	
122.4	100.0
114.7	95
108.2	90
95.0	80
78.6	70
63.3	60
A + AB	
54.7U	52.5
AB	
50.9	40
46.5	30
AB + B	
35.7E	17.6
B	
46.2	10
52.0	5
56.5	0

612. [125, 219, 406, 411] B = $C_{10}H_8$ Naphthalene

°C	Wt. % A
A	
122.0	100
117.3	95
A + AB	
113.5E	91
AB	
134.5	85
141.2	80
147.5	70
149.0	**64.1**
148.4	60
144.7	50
139.3	40
129.0	30
111.0	20
AB + B	
78.0E	9
B	
79.0	5
80.1	0

614. [278] B = $C_{10}H_8O$ β-Naphthol

°C	Mol % A
A	
122.2	100.0
117.0	95.6
A + AB	
111.0E	91.0
AB	
118.0	86.4
120.2	85.4
146.0	70.2
151.0	62.9
156.4	51.4
157.0	**50.0**
150.8	35.2
136.4	23.1
127.0	12.4
AB + B	
116.0E	6.0
B	
117.0	4.87
121.0	0.0

615. [210] B = $C_{10}H_{14}O$ Thymol

°C	Mol % A
A	
118.5	100
113.1	90
107.6	80
104.8	75
102.1	70
99.3	65
96.5	60
A + AB	
94.0E	56
AB	
96.8	**50**
95.4	45
93.4	40
90.7	35
87.7	30
83.5	25
77.5	20
69.2	15
59.6	10
AB + B	
47.5E	4.5
B	
49.6	0.0

616. [108, 253] B = $C_{10}H_{16}O$ Camphor

°C	Mol % A
A	
121.8	100
114.2	90
107.4	80
100.6	70
92.5	60
83.0	50
74.3	40
A + B	
66.4E	30.5
B	
87.7	30
106.1	20

616.—(*Continued*)

°C	Mol % A
B	
145.1	10
178.0	0

617. (234)
B = $C_{10}H_{16}O$
Fenchone

°C	Wt. % A
A	
121.3	100
A + B	
0.0E	10
B	
5.3	0

618. (103)
B = $C_{12}H_8$
Acenaphthylene

A	
122.4	100.0
A + AB	
113.9E	95.6
AB	
165.5	**60.1**
AB + B	
90.4E	7.3
B	
93.1	0.0

619. (263)
B = $C_{12}H_9N$
Carbazole

A	
121.0	100
A + AB	
113.0E	93.3
AB	
135.5	90
162.0	80
176.6	70
183.2	**59.9**
AB + B	
181.5 E	49.0
B	
197.8	40
211.8	30
222.7	20
230.0	10
233.1	5
236.0	0

620. (103)
B = $C_{12}H_9NO_2$
Nitroacenaphthene

A	
122.4	100.0
A + B	
69.7E	55.4
B	
100.9	0.0

621. (103, 239)
B = $C_{12}H_{10}$
Acenaphthene

A	
122.4	100.0
117.0	95
A + AB	
112.3E	90.7

621.—(*Continued*)

°C	Wt. % A
AB	
140.8	85
150.2	80
157.7	70
160.8	**59.8**
155.8	50
145.6	40
129.4	30
110.4	20
99.8	15
AB + B	
87.6E	9.7
B	
92.0	5
95.2	0

622. (103)
B = $C_{12}H_{10}$
Diphenyl

A	
122.4	100
114.7	95
108.6	90
88.3	80
77.3	70
66.7	60
55.1	50
A + B	
54.1E	38.6
B	
60.6	30
60.6	20
65.4	10
68.1	5
70.5	0

622.1. (274.2)
B = $C_{12}H_{10}N_2$
Azobenzene

A	
121.5	100
A + B	
56.0E	32.5
B	
67	0

623. (138, 261)
B = $C_{12}H_{11}N$
Diphenylamine

A	
120.0	100
A + AB	
66.0U	54
AB + B	
44.0E	30
B	
53.1	0

624. (230)
B = $C_{13}H_{10}$
Fluorene

A	
122.0	100
111.2	90
100.0	80
87.2	70
A + AB	
80.0E	65.5

624.—(*Continued*)

°C	Wt. % A
AB	
83.2	60
84.0	**57.9**
83.6	50
AB + B	
79.5E	43.5
B	
82.9	40
92.4	30
100.7	20
108.0	10
112.5	0

625. (249)
B = $C_{13}H_{10}O$
Benzophenone

A	
121.0	100.0
A + AB	
27.2U	37.5
A + B	
20.0mE	36.0
AB + B	
27.0E	29.0
B	
47.0	0.0

626. (103, 235)
B = $C_{13}H_{12}$
Diphenylmethane

A	
122.0	100
115.5	95
111.5	90
108.2	85
105.3	80
100.5	70
95.7	60
A + A_xB_y	
91.0U	53
A_xB_y	
85.0	40
76.0	30
60.0	20
48.0	15
A_xB_y + B	
24.5E	10
B	
25.6	5
26.6	0

626.1. (234.1)
B = $C_{13}H_{12}O$
Benzhydrol

A	
121.5	100
A + A_2B	
113.0E	89.0
A_2B	
131.0	**72.9**
A_2B + B	
54.5E	15
B	
64.5	0

627. (221)
B = $C_{14}H_{10}$
Anthracene

627.—(*Continued*)

°C	Wt. % A
A	
122.5	100
117.0	95
A + AB	
109.0E	88.8
AB	
125.5	80
137.0	70
AB + B	
141.0U	62.9
B	
161.6	50
173.6	40
183.8	30
193.7	20
202.8	10
207.3	5
212.0	0

628. (103)
B = $C_{14}H_{10}$
Phenanthrene

A	
122.4	100
114.1	95
107.4	90
A + AB	
93.8E	81.4
AB	
118.5	70
130.7	60
132.8	**56.2**
128.6	50
116.0	40
AB + B	
81.6E	23.5
B	
84.9	20
94.2	10
97.1	5
99.2	0

629. (103)
B = $C_{14}H_{12}$
Stilbene

A	
122.4	100
117.8	95
117.6	90
104.3	80
96.6	70
A + AB	
90.2E	63.7
AB + B	
92.8U	57.5
B	
99.2	50
104.7	40
109.2	30
114.4	20
118.8	10
120.4	5
122.2	0

630. (103)
B = $C_{14}H_{14}$
Dibenzyl

630.—(*Continued*)

°C	Wt. % A
A	
122.4	100.0
A + B	
47.1E	18.7
B	
51.8	0.0

631. (103)
B = $C_{17}H_{14}$
α-Benzyl-naphthalene

A	
122.4	100.0
117.9	95
111.8	90
106.3	85
100.7	80
92.0	70
A + AB	
87.5E	65.2
AB	
91.8	60
97.0	**51.2**
91.8	40
79.1	30
60.4	20
AB + B	
37.8E	8.5
B	
44.1	5
51.3	0

632. (103)
B = $C_{18}H_{18}$
Retene

A	
122.4	100
117.5	95
114.0	90
105.3	80
A + AB	
100.7E	74.7
AB	
105.6	70
115.6	60
120.9	**50.6**
108.5	40
88.4	30
AB + B	
60.1E	79.8
B	
82.5	10
90.0	5
95.2	0

633. (14)
B = $C_{19}H_{13}N$
5-Phenylacridine

°C	Mol % A
A	
120.3	100.0
A + A_2B	
118.8E	97.0
A_2B + AB	
176.0U	70.0

633.—(*Continued*)

°C	Mol % A
AB	
227.7	**50.0**
AB + B	
169.4	22.0
B	
181.9	0.0

634. (103, 254)
B = $C_{19}H_{16}$
Triphenylmethane

°C	Wt. % A
A	
122.0	100.0
Immiscible	
113.5	92–30
A + B	
86.0E	10
B	
92.0	0

635. (243)
B = $C_{19}H_{16}O$
Triphenyl carbinol

A	
122.0	100
120.0	95
117.6	90
112.1	80
A + AB	
110E	77
AB	
118.8	70
129.9	60
137.5	50
138.5	**46.8**
133.6	40
AB + B	
122E	34
B	
141.0	20
150.5	10
154.8	5
159.0	0

v. also 270, 319, 439, 458.1, 459, 526, 553, 1860

$C_6H_3N_3O_8$

Styphnic acid

635.1. (444.1)
B = $C_6H_{10}O_4$
Glycol diacetate

°C	g A per 100 cc B
20–25	15.0

636. (110)
B = $C_7H_5N_3O_6$
2, 4, 6-Trinitro-toluene

°C	Wt. % A
A	
175.5	100.0
A + B	
67.5	19.3
B	
78.8	0.0

$C_6H_3N_3O_8$.—(*Continued*)

637. (110) B = $C_8H_7N_3O_6$ 2, 4, 6-Trinitro-*m*-xylene

°C	Wt. % A
A	
175.5	100.0
A + B	
141.0E	61.8
B	
180.2	0.0

638. (110) B = $C_{10}H_7Br$ *α*-Bromonaphthalene

A	
175.5	100.0
A + AB	
101.2U	43.0
AB + B	
6.2E	0.5
B	
6.4	0.0

639. (110) B = $C_{10}H_7Br$ *β*-Bromonaphthalene

A	
175.5	100.0
A + AB	
131.7U	50.0
AB + B	
56.9E	2.2
B	
58.3	0.0

640. (110) B = $C_{10}H_7Cl$ *α*-Chloronaphthalene

A	
175.5	100
A + AB	
109.8U	47.5

641. (110) B = $C_{10}H_7NO_2$ *α*-Nitronaphthalene

A	
175.5	100.0
A + B	
45.2E	15.7
B	
56.5	0.0

642. (110) B = $C_{10}H_8$ Naphthalene

A	
175.5	100.0
A + AB	
148.8E	86.4
AB	
165.5	**65.7**

642.—(*Continued*)

°C	Wt. % A
AB + B	
79.2	4.3
B	
80.0	0.0

643. (108) B = $C_{10}H_{16}O$ Camphor

°C	Mol % A
A	
175.5	100.0
A + B	
82.6E	25.3
B	
178.0	0.0

644. (110) B = $C_{12}H_9NO_2$ Nitroacenaphthene

°C	Wt. % A
A	
175.5	100.0
A + B	
80.3E	52.3
B	
100.9	0.0

645. (110) B = $C_{12}H_{10}$ Acenaphthene

A	
175.5	100.0
A + AB	
136.1E	78.3
AB	
156.0	**61.4**
AB + B	
89.5E	10.7
B	
96.2	0.0

646. (110) B = $C_{12}H_{10}$ Diphenyl

A	
175.5	100.0
A + B	
61.5E	16.6
B	
70.5	0.0

647. (110) B = $C_{13}H_{10}$ Fluorene

A	
175.5	100.0
A + AB	
127.5U	52.5
AB + B	
97.1E	24.4
B	
112.3	0.0

648. (110) B = $C_{13}H_{12}$ Diphenylmethane

A	
175.5	100.0
144.6	59.8–43.0

648.—(*Continued*)

°C	Wt. % A
A + B	
22.6E	2.5
B	
26.6	0.0

649. (110) B = $C_{14}H_{10}$ Anthracene

A	
175.5	100.0
A + AB	
151.4E	84.5
AB	
176.3	**56.5**
AB + B	
170.1E	45.4
B	
213.0	0.0

650. (110) B = $C_{14}H_{10}$ Phenanthrene

A	
175.5	100.0
A + AB	
125.6E	70.7
AB	
132.7	**56.5**
AB + B	
85.7E	18.3
B	
99.2	0.0

651. (110) B = $C_{14}H_{12}$ Stilbene

A	
175.5	100.0
A + AB	
142.4U	55
AB	
114.6E	19.2
B	
122.5	0.0

652. (110) B = $C_{14}H_{14}$ Dibenzyl

A	
175.5	100.0
A + B	
50.7E	6.4
B	
51.8	0.0

653. (110) B = $C_{17}H_{14}$ *α*-Benzylnaphthalene

A	
175.5	100.0
A + AB	
134.3U	52.9
AB + B	
47.5E	1.8
B	
51.3	0.0

654. (110) B = $C_{18}H_{18}$ Retene

°C	Wt. % A
A	
175.5	100.0
A + AB	
125.6E	66.4
AB	
135.7	**51.1**
AB + B	
76.2E	16.6
B	
95.2	0.0

655. (110) B = $C_{19}H_{16}$ Triphenylmethane

A	
175.5	100.0
167.4	85.5 to 49.5
A + B	
94.2E	4.0
B	
92.2	0.0

v. also 554

$C_6H_3N_4O_8$
Tetranitroaniline

655.1. (444.1) B = $C_6H_{10}O_4$ Glycol diacetate

°C	g A per 100 g B
25.0	2.39

C_6H_4BrCl
o-Bromochlorobenzene

656. *v.* p. 175 B = C_6H_4BrCl *p*-Bromochlorobenzene *v. also* 1854

C_6H_4BrCl
p-Bromochlorobenzene

657. (59, 60) B = $C_6H_4Br_2$ *p*-Dibromobenzene

°C	Mol % A
Mix.	
67.0	100.0
70.0	84.3
72.5	72.0
75.0	59.3
77.5	47.0
80.0	34.5
82.5	22.0
85	9.2
87.1	0.0

v. also 1855

658. (59, 60) B = $C_6H_4Cl_2$ *p*-Dichlorobenzene

658.—(*Continued*)

°C	Mol % A
Mix.	
67.0	100
65.0	86.0
62.5	70.0
60.0	59.0
57.5	48.0
55.0	34.0
52.6†	2.5
52.8	0.0

v. also 656, 1854, 1855

C_6H_4BrI
p-Bromoiodobenzene

659. (349) B = $C_6H_4Br_2$ *p*-Dibromobenzene

Mix.	
89.9	100
88.8	90
87.4	80
86.5	70
86.0	60
85.4	50
85.1	40
85.1†	35
85.1	30
85.4	20
86.3	10
87.1	0

660. (349) B = $C_6H_4I_2$ *p*-Diiodobenzene

Mix.	
89.9	100
90.4	95
91.6	90
95.6	80
100.5	70
106.0	60
111.0	50
115.5	40
119.7	30
123.0	20
125.5	10
128.0	0

$C_6H_4BrNO_2$
o-Bromonitrobenzene

661. *v.* p. 175 B = $C_6H_4BrNO_2$ *m*-Bromonitrobenzene

662. *v.* p. 175 B = $C_6H_4BrNO_2$ *p*-Bromonitrobenzene

663. (227) B = $C_6H_4ClNO_2$ *o*-Chloronitrobenzene

663.—(*Continued*)

°C		Mol % A
Mix.		
t_L	t_S	
34.2	34.2	100
33.6		90
33.2	33.0	80
32.7		70
32.2	32.0	60
32.1		50
32.0		40
31.9		30
31.8†	31.8†	20
31.9		10
32.0	32.0	0

664. *v.* p. 175 B = C_6H_6

$C_6H_4BrNO_2$
m-Bromonitrobenzene

665. *v.* p. 175 B = $C_6H_4BrNO_2$ *p*-Bromonitrobenzene

666. (150, 238) B = $C_6H_4ClNO_2$ *m*-Chloronitrobenzene

Mix.		
54.0	54.0	100
53.2	53.1	95
52.5	52.3	90
51.1	50.7	80
49.5	49.0	70
48.25	47.8	60
47.4	47.0	50
46.7	46.3	40
46.0	45.7	30
45.5	45.3	20
45.0	44.9	10
44.8	44.7	5
44.6	44.6	0

667. (150) B = $C_6H_4FNO_2$ *m*-Fluoronitrobenzene

Mix.		
54.0	54.0	100
52.0	46.0	95
50.0	38.0	90
45.2	24.5	80
39.7	15.0	70
32.8	9.5	60
24.8	5.7	50
17.0	+2.5	40
+8.5	0.0	30
0.0	−2.5	20
−4.4†	−4.4†	9
0.0	−3.5	5
+4.1	+4.1	0

668. (150)
B = $C_6H_4INO_2$
m-Iodonitrobenzene

Mix. t_L °C	t_S °C	Wt. % A
54.0		100
53.0	52.3	95
52.0	50.7	90
49.8	48.0	80
47.4	45.5	70
44.8	43.0	60
42.4	40.5	50
39.9	38.0	40
37.3	35.4	30
34.5	33.0	20
32.3†	32.3†	12.5
33.5	32.5	5
34.6	34.6	0

669. *v.* p. 175
B = C_6H_6

v. also 661

$C_6H_4BrNO_2$
p-Bromonitrobenzene

670. (227)
B = $C_6H_4ClNO_2$
p-Chloronitrobenzene

t_L °C	t_S °C	Mol % A
A		
123.0	123.0	100
A + Mixed crystals		
118.6	116.5	90
114.3	111.0	80
110.0	106.3	70
105.4	101.5	60
100.4	97.0	50
95.0	92.0	40
89.5	87.0	30
B + Mixed crystals		
84.6	83.0	20
83.7	82.0	10
B		
82.0	82.0	0

671. *v.* p. 175
B = C_6H_6

v. also 662, 665

$C_6H_4Br_2$
o-Dibromobenzene

672. *v.* p. 175
B = $C_6H_4Br_2$
p-Dibromobenzene

v. also 1856

$C_6H_4Br_2$
p-Dibromobenzene

673. *v.* p. 175
B = $C_6H_4ClNO_2$
m-Chloronitrobenzene

674. (379.5)
B = $C_6H_4ClNO_2$
p-Chloronitrobenzene

°C	Wt. % A
A	
86.4	100.0
A + AB	
75.0E	75.0
AB	
78.1	**59.9**
AB + B	
77.1E	30.0
B	
82.4	0.0

675. (59, 60)
B = $C_6H_4Cl_2$
p-Dichlorobenzene

Mix. t_L °C	t_S °C	Mol % A
87.1	87.1	100
85.4	77.5	95
83.7	72.0	90
80.0	66.0	80
76.0	62.5	70
72.0	60.1	60
67.3	58.4	50
62.9	57.1	40
59.1	56.0	30
55.8	54.8	20
53.8	53.7	10
52.8	52.8	0

v. also 1855

676. (349)
B = $C_6H_4I_2$
p-Diiodobenzene

A		
87.1	87.1	100
83.0		90
81.1		80
A + B		
80.0		69
B		
90.5	80.0	60
99.7	80.0	50
107.0	80.0	40
113.0		30
118.5		20
123.6		10
128.0		0

Solid B soluble in solid A, but solid A insoluble in solid B

677. *v.* p. 175
B = C_6H_5Br
Bromobenzene

678. *v.* p. 175
B = $C_6H_5NO_2$
Nitrobenzene

679. *v.* p. 175
B = C_6H_6

680. *v.* p. 175
B = C_6H_7N
Aniline

681. (49)
B = C_7H_7Br
p-Bromotoluene

°C	Wt. % A
A	
87.05	100.0
85.9	98.6
82.9	95.7
79.6	89.9
74.8	82.2
69.5	75.4
60.1	65.0
52.3	55.0
40.7	43.0
38.5	41.0
37.4	39.2
A + mixed crystals	
38.5U	36.7

t_L °C	t_S °C	Wt. % A
B + mixed crystals		
36.4	36.2	36.8
34.4	34.1	33.2
32.8	30.4	22.9
30.7	27.8	15.0
28.6	27.7	7.3
28.0	27.6	5.0
B		
26.5		0.0

682. *v.* p. 175
B = C_7H_8

683. (100)
B = $C_{10}H_{16}O$
Camphor

°C	Mol % A
A	
87.1	100
A + B	
40.0E	40.5
B	
178.0	0.0

v. also 7, 22, 320, 403, 472, 496, 657, 659, 672, 1855, 1856

$C_6H_4Br_2ClN$
2-Chloro-4, 6-dibromoaniline

684. (440)
B = $C_6H_4Br_3N$
2, 4, 6-Tribromoaniline

Mix. °C	Mol % A
98.0	100
102.8	80
109.0	50
115.3	20
119.5	0

$C_6H_4Br_3N$
2, 4, 6-Tribromoaniline
v. 684

C_6H_4ClI
p-Chloroiodobenzene

685. (349)
B = $C_6H_4Cl_2$
p-Dichlorobenzene

Mix. t_L °C	t_S °C	Mol % A
53.0	53.0	100
50.5	50.0	90
48.0	47.0	80
45.0	44.0	70
42.5	42.1	60
41.0	41.0	50
41.0†	41.0†	45
41.0	41.0	40
42.9	41.5	30
46.5	43.6	20
50.2	48.0	10
52.8	52.8	0

686. (349)
B = $C_6H_4I_2$
p-Diiodobenzene

Mix.		
53.0		100
57.0		95
58.5		90
Two series mixed crystals		
59.0U	59.0	85.5
66.5	59.0	80
78.5	59.0	70
88.7	59.0	60
97.4	59.0	50
105.0	59.0	40
111.3	59.0	30
117.2	59.0	20
122.5		10
128.0		0

Immiscibility range 22 to 86 Mol % B

$C_6H_4ClNO_2$
o-Chloronitrobenzene

687. *v.* p. 175
B = $C_6H_4ClNO_2$
p-Chloronitrobenzene

688. *v.* p. 175
B = C_6H_6

689. (225)
B = C_6H_7N
Aniline

°C	Mol % A
A	
32.0	100.0
27.0	88.7
20.7	75.3
14.5	63.3
9.0	55.8
+ 2.0	45.2
− 3.0	38.5
−12.0	30.1
−17.0	24.7
A + B	
−19E	23
B	
−17.0	19.9
−13.5	14.7
−11.0	9.7
− 7.8	4.4
− 5.5	0.0

690. (101)
B = $C_{10}H_{16}O$
Camphor

°C	Mol % A
A	
31.5	100.0
A + B	
2.6E	41.5
B	
178.0	0.0

v. also 60, 663

$C_6H_4ClNO_2$
m-Chloronitrobenzene

691. (150)
B = $C_6H_4FNO_2$
m-Fluoronitrobenzene

Mix. t_L °C	t_S °C	Mol % A
44.6	44.6	100
43.2	36.0	95
41.6	28.0	90
38.1	15.0	80
33.8	8.5	70
27.5	5.0	60
20.0	3.0	50
13.0	1.5	40
6.7	+0.5	30
+1.0	−0.3	20
−0.7†	−0.7†	15
+0.4	−0.2	10
2.5	+1.5	5
4.1	4.1	0

692. (150)
B = $C_6H_4INO_2$
m-Iodonitrobenzene

Mix. t_L °C	t_S °C	Wt. % A
44.6	44.6	100
43.5	42.0	95
42.5	40.0	90
40.5	37.0	80
38.5	35.0	70
36.3	33.3	60
33.4	31.5	50
30.8	30.0	40
29.1	29.1	30
28.4†	28.4†	17
29.7	29.2	10
31.7	30.8	5
34.6	34.6	0

693. *v.* p. 175
B = C_6H_6

694. (259)
B = C_6H_7N
Aniline

°C	Mol % A
A	
43.0	100.0
39.5	88.6
32.0	72.0
23.0	54.6
13.0	39.8
3.0	27.7
+ 0.3	24.7
− 4.0	19.3
A + B	
−12.0E	12.4
B	
− 8.2	5.7
− 6.3	0.0

695. (259)
B = $C_{10}H_8$
Naphthalene

°C	Mol % A
A	
43.5	100.0
37.3	84.4
A + B	
23.0E	64.5
B	
33.5	55.9
46.5	43.4
60.0	28.7
70.5	13.9
80.5	0.0

696. (101)
B = $C_{10}H_{16}O$
Camphor

°C	Mol % A
A	
43.9	100.0
A + B	
11.5E	43.6
B	
178.0	0.0

v. also 666, 673

$C_6H_4ClNO_2$
p-Chloronitrobenzene

697. *v.* p. 175
B = C_6H_6

$C_6H_4ClNO_2$.—(Continued)

698. (259)
B = C_6H_7N
Aniline

°C	Mol % A
A	
82.5	100.0
77.0	88.6
62.0	67.2
46.5	50.5
29.5	36.9
+10.0	26.7
A + B	
−15.0E	19.0
B	
−12.6	13.0
− 6.3	0.0

699. (259)
B = $C_{10}H_8$
Naphthalene

A	
80.5	100.0
71.0	82.1
53.0	59.6
43.8	51.6
A + B	
40E *ca.*	*ca.* 49
B	
49.0	39.6
63.0	24.0
71.0	13.9
80.0	0.0

700. (453)
B = $C_{12}H_{11}N$
Diphenylamine

A	
82.5	100.0
A + B	
27.0E	42.5
B	
54.2	0.0

v. also 670, 674, 687

$C_6H_4Cl_2$
o-Dichlorobenzene
701. *v.* p. 175
B = $C_6H_4Cl_2$
p-Dichlorobenzene
v. also 1857

$C_6H_4Cl_2$
p-Dichlorobenzene
702. (349)
B = $C_6H_4I_2$
p-Diiodobenzene

°C	Mol % A
A	
52.7	100
50.5	95
47.5	90
A + B	
45.0E	86

702.—(*Continued*)

°C	Mol % A
B	
57.8	80
75.5	70
86.7	60
95.5	50
102.5	40
110.0	30
116.0	20
121.3	10
128.0	0

v. also 658, 675, 685, 701, 1855, 1857

$C_6H_4Cl_2O_4S_2$
m-Benzene-disulfonyl chloride
703. *v.* p. 175
B = $C_6H_4Cl_2O_4S_2$
p-Benzene-disulfonyl chloride

704. (308)
B = $C_7H_4Cl_2O_3S$
sym-Chloride of *m*-sulfobenzoic acid

°C	Mol % A
20.4	0
12.9	10
9.0	15

v. also 1858

$C_6H_4Cl_2O_4S_2$
p-Benzene-disulfonyl chloride
705. (308)
B = $C_7H_4Cl_2O_3S$
sym-Chloride of *p*-sulfobenzoic acid

20.4	0
14.6	8.2

v. also 703, 1859

$C_6H_4FNO_2$
o-Fluoronitrobenzene
706. (166)
B = $C_6H_4FNO_2$
p-Fluoronitrobenzene

°C	% A
A	
− 8.0	100.0
B	
+18.1	13.0
23.5	4.9
26.4	0.0

$C_6H_4FNO_2$
m-Fluoronitrobenzene
v. 667, 691

$C_6H_4FNO_2$
p-Fluoronitrobenzene
v. 552, 706

$C_6H_4INO_2$
o-Iodonitrobenzene
707. *v.* p. 175
B = $C_6H_4INO_2$
p-Iodonitrobenzene

$C_6H_4INO_2$
m-Iodonitrobenzene
v. 668, 692

$C_6H_4I_2$
p-Diiodobenzene
v. 660, 676, 686, 702

$C_6H_4N_2O_4$
o-Dinitrobenzene
708. *v.* p. 175
B = $C_6H_4N_2O_4$
m-Dinitrobenzene

709. *v.* p. 175
B = C_6H_6

710. (259)
B = C_6H_7N
Aniline

°C	Mol % A
A	
116.5	100.0
108.0	82.9
92.0	64.2
73.0	44.5
54.0	29.0
37.0	19.8
+12.0	9.7
A + B	
−11.0E	*ca.* 4.8
B	
− 8.5	3.5
− 5.5	0.0

711. (247)
B = C_6H_7NO
m-Aminophenol

°C	Wt. % A
A	
115.7	100.0
A + B	
89.0E	55.0
B	
118.0	0.0

712. (264)
B = $C_6H_8N_2$
o-Phenylenediamine

A	
115.0	100.0
A + B	
74.1E	48.0
B	
99.8	0.0

713. (264)
B = $C_6H_8N_2$
m-Phenylenediamine

A	
115.0	100.0

713.—(*Continued*)

°C	Wt. % A
A + B	
42.0E	26.0
B	
62.0	0.0

714. *v.* p. 175
B = $C_7H_5N_3O_6$
2, 4, 6-Trinitrotoluene

716. *v.* p. 175
B = $C_7H_6N_2O_4$
2, 4-Dinitrotoluene

717. (258)
B = $C_7H_6O_2$
m-Hydroxybenzaldehyde

°C	Wt. % A
A	
115.0	100.0
A + B	
84.0E	44.0
B	
105.0	0.0

718. (256)
B = C_7H_9N
p-Toluidine

A	
114.8	100.0
A + B	
31.5E	26.0
B	
42.5	0.0

719. *v.* p. 176
B = $C_{10}H_8$
Naphthalene

720. *v.* p. 176
B = $C_{10}H_9N$
α-Naphthylamine

721. *v.* p. 176
B = $C_{10}H_9N$
β-Naphthylamine

722. (265)
B = $C_{12}H_9N$
Carbazole

°C	Wt. % A
A	
116.5	100
111.0	90
A + B	
107.0E	85
B	
125.0	80
153.3	70
174.3	60
190.1	50
203.0	40
214.1	30
223.2	20
230.5	10
236.0	0

723. *v.* p. 176
B = $C_{12}H_{10}$
Acenaphthene

724. *v.* p. 176
B = $C_{13}H_{10}$
Fluorene

725. (252)
B = $C_{14}H_{10}$
Anthracene

°C	Wt. % A
A	
116.5	100
A + B	
110.0E	87.5
B	
130.0	80
149.5	70
162.6	60
174.3	50
183.9	40
192.5	30
200.1	20
206.5	10
212.5	0

726. *v.* p. 176
B = $C_{14}H_{10}$
Phenanthrene

727. (243)
B = $C_{19}H_{16}O$
Triphenyl carbinol

A	
116.5	100.0
A + B	
102.0E	67.0
B	
159.5	0.0

v. also 73, 555

$C_6H_4N_2O_4$
m-Dinitrobenzene
728.
B = C_6H_5Br
Bromobenzene
v. Seidell, p. 131

729. (430)
B = $C_6H_5NO_2$
Nitrobenzene

°C	Wt. % B
5.22	100
4.35	98
3.42	96
2.41	94
1.47	92
0.55	90

730. *v.* p. 176
B = C_6H_6

732. (82)
B = $C_6H_6N_2O_2$
m-Nitroaniline

°C	Mol % A
A	
90.2	100.0
83.7	90.0
76.1	70.0
63.3	65.0
A + B	
60.0E	61.5

732.—(*Continued*)

°C	Mol % A
B	
62.5	60.0
69.6	55.0
73.5	50.0
78.0	45.0
83.6	40.0
93.5	30.0
100.5	20.0
107.5	10.0
114.0	0.0

733. (222)
B = C_6H_7N
Aniline

A	
91.0	100.0
85.5	91.1
80.0	81.8
65.0	66.0
53.0	54.6
A + AB	
41.5U	46.2
AB	
39.0	39.0
37.0	31.8
26.5	20.8
+14.0	13.3
− 2.0	6.6
AB + B	
− 8.0E	4.2
B	
− 6.0	1.5
− 5.5	0.0

734. (247)
B = C_6H_7NO
m-Aminophenol

°C	Wt. % A
A	
89.0	100.0
A + B	
74.5E	77.0
B	
118.0	0.0

735. (264)
B = $C_6H_8N_2$
o-Phenylenediamine

A	
89.0	100.0
A + A_3B_2	
58.0E	71
A_3B_2	
58.0	**70.0**
A_3B_2 + B	
58.0E	65
B	
99.8	0.0

736. (264)
B = $C_6H_8N_2$
m-Phenylenediamine

A	
89.0	100.0
A + AB_2	
36E	50

736.—(*Continued*)

°C	Wt. % A
AB_2	
36	**43.8**
AB_2 + B	
36E	40
B	
61.9	0

737. (264)
B = $C_6H_8N_2$
p-Phenylenediamine

A	
89.0	100.0
A + B	
74.0E	78.0
B	
138.0	0.0

738. *v.* p. 176
B = $C_7H_5N_3O_6$
2, 4, 6-Trinitrotoluene

739. *v.* p. 176
B = $C_7H_6N_2O_4$
2, 4-Dinitrotoluene

740. (258)
B = $C_7H_6O_2$
m-Hydroxybenzaldehyde

°C	Wt. % A
A	
87.5	100.0
A + B	
63.0E	66.0
B	
105.0	0.0

741. *v.* p. 176
B = $C_7H_7NO_2$
p-Nitrotoluene

742. (256)
B = C_7H_9N
p-Toluidine

°C	Wt. % A
A	
89.0	100.0
A + B	
16.0E	48.5
B	
42.5	0.0

743. *v.* p. 176
B = C_8H_9NO
Acetanilide

744. (222, 354)
B = $C_{10}H_8$
Naphthalene

°C	Mol % A
A	
87.5	100
84.2	95
80.8	90
73.3	80
64.5	70
A + AB	
50.5E	58

744.—(*Continued*)

°C	Mol % A
AB	
50.8	**50**
AB + B	
50.3E	40
B	
59.6	30
67.3	20
74.2	10
77.3	5
80.1	0

745. (237)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Wt. % A
A	
90.0	100
81.0	90
71.0	80
A + AB	
57.0E	69.0
AB	
63.2	60
63.8	**54**
63.6	50
58.7	40
47.5	30
AB + B	
33.0E	20.5
B	
41.8	10
48.0	0

746. (237)
B = $C_{10}H_9N$
β-Naphthylamine

A	
90.0	100.0
82.2	90
72.0	80
60.0	70
A + AB	
51.8E	63.8
AB + B	
53.2U	56
B	
65.0	50
80.0	40
90.5	30
97.5	20
103.5	10
109.0	0

747. (101)
B = $C_{10}H_{16}O$
Camphor

°C	Mol % A
A	
90.1	100.0
A + B	
50.5E	38.5
B	
178.0	0.0

748. (265)
B = $C_{12}H_9N$
Carbazole

748.—(*Continued*)

°C	Wt. % A
A	
88.0	100
76.0	90
A + B	
72.0E	87
B	
104.5	80
137.5	70
162.0	60
182.0	50
198.0	40
211.0	30
221.5	20
230.0	10
236.0	0

749. (132, 239)
B = $C_{12}H_{10}$
Acenaphthene

A	
89.4	100
85.7	95
82.0	90
74.3	80
A + AB	
66.3E	70.5
AB	
71.0	60
72.3	**48.5**
AB + B	
69.0E	39.5
B	
75.0	30
81.5	20
87.9	10
94.5	0

750. (132)
B = $C_{12}H_{11}N$
Diphenylamine

A	
89.4	100.0
A + B	
30.0E	39.0
B	
52.5	0.0

751. *v.* p. 176
B = $C_{13}H_{10}$
Fluorene

752. (252)
B = $C_{14}H_{10}$
Anthracene

A	
89.5	100
A + B	
84.0E	92
B	
127.2	80
148.5	70
164.5	60
176.5	50
186.7	40
195.6	30
202.3	20

752.—(*Continued*)

°C	Wt. % A
B	
208.0	10
213.0	0

753. *v.* p. 176
B = $C_{14}H_{10}$
Phenanthrene

754. (243)
B = $C_{19}H_{16}O$
Triphenyl carbinol

A	
89.0	100.0
A + B	
82.0E	82.0
B	
159.5	0.0

v. also 43, 74, 271, 387, 391, 404, 465, 466, 556, 583, 708

$C_6H_4N_2O_4$

p-Dinitrobenzene

755. (228)
B = C_6H_6

°C	Mol % B
B	
5.2	0.0
A + B	
4.8E	0.6
A	
28.0	1.7
80.9B.P.	8.0

756. (259)
B = C_6H_7N
Aniline

°C	Mol % A
A	
143.5	61.0
131.0	51.1
117.0	42.4
102.0	34.4
72.0	22.6
36.5	12.5
15.0	9.0

757. (264)
B = $C_6H_8N_2$
o-Phenylenediamine

°C	Wt. % A
A	
170.0	100.0
A + B	
84.3E	35.0
B	
100.0	0.0

758. (264)
B = $C_6H_8N_2$
m-Phenylenediamine

A	
170.0	100.0
A + B	
55.0E	19.0
B	
62.0	0.0

759. (264)
B = $C_6H_8N_2$
p-Phenylenediamine

°C	Wt. % A
A	
170.0	100.0
A + AB_2	
112E	47.5
AB_2	
114.0*ca.*	**43.7**
AB_2 + B	
112.0E	38.5
B	
138.0	0.0

760. (258)
B = $C_7H_6O_2$
m-Hydroxybenzaldehyde

A	
171.0	100.0
A + B	
91.0E	20.0
B	
105.0	0.0

761. (256)
B = C_7H_9N
p-Toluidine

A	
169.5	100.0
A + B	
36.5E	16.0
B	
42.5	0.0

762. (259)
B = $C_{10}H_8$
Naphthalene

°C	Mol % A
A	
170.5	100.0
161.0	86.6
150.0	70.7
130.0	52.7
A + AB	
117.5U	54.9
AB	
116.5	40.0
109.5	26.5
98.8	18.7
AB + B	
76.5E	7.0
B	
79.0	2.7
80.0	0.0

763. (237)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Wt. % A
A	
169.5	100
160.5	90
151.0	80
141.0	70
129.0	60
114.5	50

763.—(*Continued*)

°C	Wt. % A
A + AB	
81.8U	39
AB	
76.5	30
58.5	20
AB + B	
40.0E	13
B	
41.9	10
48.0	0

764. (237)
B = $C_{10}H_9N$
β-Naphthylamine

A	
169.5	100
161.2	90
152.5	80
143.0	70
131.3	60
117.0	50
A + AB	
91.0U	40.5
AB + B	
87.8E	32.5
B	
97.0	20
103.3	10
109.0	0

765. (265)
B = $C_{12}H_9N$
Carbazole

A	
171.5	100
165.5	90
158.3	80
A + B	
143.0E	66.5
B	
159.0	60
182.5	50
202.5	40
217.5	30
227.0	20
232.2	10
236.0	0

766. *v.* p. 176
B = $C_{12}H_{10}$
Acenaphthene

767. *v.* p. 176
B = $C_{13}H_{10}$
Fluorene

768. *v.* p. 176
B = $C_{14}H_{10}$
Anthracene

769. (228)
B = $C_{14}H_{10}$
Phenanthrene

°C	Wt. % A
A	
172.0	100
A + AB_3	
79.0E	28

$C_6H_4N_2O_4$.—(*Continued*)

769.—(*Continued*)

°C	Wt. % A
AB_3	
81.0	**24**
AB_3 + B	
80.0E	23
B	
103.0	0

770. (243) B = $C_{19}H_{16}O$ Triphenyl carbinol

A	
171.0	100.0
A + B	
132.0E	36.0
B	
159.5	0.0

v. also 75

$C_6H_4N_2O_5$
2, 3-Dinitrophenol

771. (423) B = C_6H_6

145.1	100
138.2	90
125.1	80
118.9	70
113.5	60
108.5	50
103.2	40
97.2	30
88.6	20
74.3	10

$C_6H_4N_2O_5$
2, 4-Dinitrophenol

772. *v.* p. 176 B = $C_6H_5NO_3$ *o*-Nitrophenol

773. (423) B = C_6H_6

112.9	100
102.3	90
94.5	80
87.7	70
82.0	60
75.8	50
69.0	40
61.2	30
49.0	20

774. (224) B = C_6H_7N Aniline

°C	Mol % A
A	
110.5	100
106.0	90
100.0	80
92.5	70
84.0	60
79.7	55

774.—(*Continued*)

°C	Mol % A
A + AB	
74.0U	50
AB	
73.8	45
73.4	40
70.7	30
62.5	20
45.5	10
+24.0	5
AB + B	
− 7.0E	1.5
B	
− 6.3	0.0

775. (272) B = $C_6H_8N_2$ *o*-Phenylenediamine

°C	Wt. % A
A	
110.0	100.0
A + AB	
83.5E	74.0
AB	
85.0	**63**
AB + B	
72.0E	43.0
B	
100.2	0.0

776. (272) B = $C_6H_8N_2$ *m*-Phenylenediamine

A	
111.0	100.0
A + AB	
91.5E	75.0
AB	
100.0	**63**
AB + B	
53.0E	19.0
B	
62.0	0.0

777. (272) B = $C_6H_8N_2$ *p*-Phenylenediamine

A	
110.0	100.0
A + A_3B	
107.0E	97.0
A_3B	
118.0	**83.6**
A_3B + A_2B	
109.0U	74.0
A_2B + B	
88.5E	37.5
B	
138.5	0.0

778. (258) B = $C_7H_6O_2$ *m*-Hydroxy-benzaldehyde

A	
112.0	100.0
A + AB	
78.0	63.0

778.—(*Continued*)

°C	Wt. % A
AB	
78.5	**60.0**
AB + B	
78.0E	43.0
B	
105.0	0.0

779. (208) B = $C_7H_8O_2$ Dimethylpyrone

°C	Mol % A
A	
114.0	100
111.7	95
108.6	90
104.8	85
100.3	80
95.1	75
89.1	70
80.3	65
A + AB	
73.0E	61.5
AB	
77.4	55
78.4	**50**
AB + B	
77.3E	44
B	
87.3	40
97.2	35
105.8	30
112.5	25
117.9	20
122.7	15
126.6	10
132.1	0

780. (249) B = C_8H_8O Acetophenone

°C	Wt. % A
A	
110.0	100.0
A + B	
12.0E	21.0
B	
20.5	0.0

781. *v.* p. 176 B = C_8H_9NO Acetanilide

781.1. (274.1) B = $C_9H_8O_2$ Cinnamic acid

°C	Wt. % A
A	
112.0	100
A + AB?	
91.0E	70.0
AB?	
91.0	
AB? + B	
91.0U	59.0
B	
133.0	0

782. (222, 410) B = $C_{10}H_8$ Naphthalene

°C	Mol % A
A	
111.4	100
105.8	90
99.8	80
93.3	70
A + AB	
88.5E	63.5
AB	
90.1	60
92.0	**50**
91.3	40
87.4	30
78.2	20
AB + B	
71.5E	14.8
B	
74.6	10
80.1	0

783. (237) B = $C_{10}H_9N$ α-Naphthylamine

°C	Wt. % A
A	
109.0	100
104.8	90
96.5	80
A + AB	
90.0E	74
AB	
97.2	70
104.5	**56.3**
103.8	50
98.7	40
88.8	30
74.0	20
51.2	10
AB + B	
42.0E	7
B	
48.0	0

784. (237) B = $C_{10}H_9N$ β-Naphthylamine

A	
109.0	100
103.5	90
95.2	80
84.6	70
A + AB	
72.0E	60.5
AB	
72.3	**56.3**
AB + B	
72.0E	49.5
B	
81.7	40
90.5	30
97.8	20
103.8	10
109.0	0

785. (108, 253) B = $C_{10}H_{16}O$ Camphor

°C	Mol % A
A	
111.4	100.0
A + B	
69.3E	30.7
B	
178.0	0.0

786. (234) B = $C_{10}H_{16}O$ Fenchone

°C	Wt. % A
A	
111.0	100.0
A + B	
2.0E	6.0
B	
5.3	0.0

787. (238) B = $C_{11}H_{12}N_2O$ Antipyrine

A	
110.5	100.0
Vis.	
60 to 58	62.2 to 38.9
B	
109.8	0.0

788. (263) B = $C_{12}H_9N$ Carbazole

A	
110.0	100
103.5	90
A + B	
98.6E	83
B	
141.5	70
165.0	60
184.0	50
199.2	40
211.0	30
220.8	20
229.0	10
236.5	0

789. (239) B = $C_{12}H_{10}$ Acenaphthene

A	
110.0	100.0
A + AB	
83.0E	68.0
AB	
86.0	**54.4**
AB + B	
74.0E	29.0
B	
90.5	0.0

789.1. (274.2) B = $C_{12}H_{10}N_2$ Azobenzene

789.1.—(*Continued*)

°C	Wt. % A
A	
112.0	100
A + B	
54.0E	28.0
B	
67	0

790. (261) B = $C_{12}H_{11}N$ Diphenylamine

A	
108.0	100.0
A + B	
41.6E	28.0
B	
52.0	0.0

791. *v.* p. 176 B = $C_{13}H_{10}$ Fluorene

792. (249) B = $C_{13}H_{10}O$ Benzophenone

°C	Wt. % A
A	
110.0	100.0
A + B	
35.0E	20.0
B	
47.0	0.0

792.1. (234.1) B = $C_{13}H_{12}O$ Benzhydrol

A	
112.5	100
A + B	
51.0E	19.0
B	
64.5	0

793. *v.* p. 176 B = $C_{14}H_{10}$ Anthracene

794. (241) B = $C_{14}H_{10}$ Phenanthrene

°C	Wt. % B
B	
103	100.0
96	89.4
90	83.3
83	75.9
68	61.6
A + B	
61.5E	56.5
A	
67	51.7
82	39.7
96	23.9
101	15.1
107	7.0
111	0.0

v. also 440, 458.2, 459.1, 476, 584

$C_6H_4N_2O_5$
2, 5-Dinitrophenol

795. (423)

B = C_6H_6

°C	Wt. % A
105.6	100
95.4	90
87.0	80
80.3	70
74.5	60
68.6	50
61.7	40
58.7	30
49.0	20
20.0	10

$C_6H_4N_2O_5$
2, 6-Dinitrophenol

796. (423)

B = C_6H_6

°C	Wt. % A
62.2	100
52.4	90
45.3	80
39.2	70
33.8	60
28.9	50
23.7	40

$C_6H_4N_2O_5$
3, 4-Dinitrophenol

797. (423)

B = C_6H_6

°C	Wt. % A
134.7	100
125.2	90
118.8	80
115.2	70
112.7	60
110.5	50
108.9	40
107.2	30
102.8	20
93.5	10

v. also 1860

$C_6H_4N_2O_6$
2, 4-Dinitro-resorcinol

798. (108)

B = $C_{10}H_{16}O$

Camphor

°C	Mol % A
A	
142.7	100.0
A + B	
47.2E	29.0
B	
178.0	0.0

$C_6H_4N_4O_6$
Picramide

799. (107)

B = $C_{10}H_8$

Naphthalene

°C	Wt. % A
A	
185.2	100.0
A + AB	
157.6E	84.6
AB	
168.8	**64**
AB + B	
75.8E	10.5
B	
80.0	0.0

800. (107)

B = $C_{12}H_{10}$

Acenaphthene

A	
185.2	100.0
A + AB	
178.1E	93.2
AB	
195.4	**59.6**
AB + B	
93.6E	4.4
B	
96.2	0.0

801. (107)

B = $C_{13}H_{10}$

Fluorene

A	
185.2	100.0
A + AB	
127.5U	53.0
AB + B	
96.3E	19.8
B	
112.3	0.0

802. (107)

B = $C_{14}H_{10}$

Anthracene

A	
185.2	100.0
A + AB	
149.6E	74.5
AB	
158.8	**56.1**
AB + B	
152.3E	50.3
B	
213.0	0.0

803. (107)

B = $C_{14}H_{10}$

Phenanthrene

A	
185.2	100.0
A + AB	
147.1E	70.4
AB	
160.2	**56.1**
AB + B	
93.4E	15.7
B	
99.2	0.0

804. (107)

B = $C_{18}H_{18}$

Retene

°C	Wt. % A
A	
185.2	100.0
A + AB	
124.3	52.0
AB	
125.1	**49.3**
AB + B	
76.7E	12.3
B	
95.2	0.0

v. also 585

$C_6H_4O_2$
p-Quinone

805. (266)

B = $C_6H_5NO_2$

Nitrobenzene

100	75.6
80	48.8
60	34.2
40	23.5

v. also 1860

806. (266)

B = $C_6H_6O_2$

Hydroquinol

A	
114.5	100
A + AB	
107.0E	97
AB	
140.0	90
153.0	80
161.0	70
166.7	60
169.0	**50**
165.5	40
158.0	30
AB + B	
150.0E	22
B	
161.0	10
165.0	5
169.0	0
(A metastable)	
A	
114.5	100
107.0m	90
97.5m	80
86.5m	70
A + AB	
75mE	62
AB	
105.0m	59
135.0m	55
168m *ca.*	*ca.* **45**
165.5m	40
158.0m	30
AB + B	
150.0E	22
B	
161.0	10
165.0	5
169.0	0

v. also 1860

807. (266)

B = $C_{10}H_8$

Naphthalene

°C	Wt. % A
A	
115.0	100
A + B	
58.0E	34
B	
80.0	0

808. (266)

B = $C_{10}H_8O$

β-Naphthol

A	
116.0	100
113.5	95
110.0	90
102	80
93.0	70
A + AB	
81.0E	58
AB	
84.5	50
85.3	**42.8**
AB + B	
79.0E	29
B	
95.0	20
111.0	10
117.0	5
122.0	0

v. also 1860

809. (266)

B = $C_{10}H_9N$

α-Naphthylamine

A	
116.0	100
113.0	95
109.5	90
100.5	80
91.0	70
80.5	60
74.5	55
67.8	50
A + AB	
59.0E	44
AB	
59.0	**43**
59.0	40
49.0	30
38.0	20
AB + B	
27.0E	17
B	
37.0	10
43.5	5
49.0	0

v. also 1860

810. (266)

B = $C_{12}H_{10}$

Acenaphthene

°C	Wt. % A
A	
115.0	100
A + B	
67.0E	37
B	
93.0	0

811. (266)

B = $C_{12}H_{11}N$

Diphenylamine

A	
115.0	100
A + B	
32.0E	24
B	
54.0	0

812. (266)

B = $C_{13}H_{10}$

Fluorene

A	
115.0	100
A + B	
72.0E	41
B	
111.0	0

813. (266)

B = $C_{14}H_{10}$

Anthracene

A	
115.0	100
A + AB	
102.5E	86
AB	
196.0	**37.7**
AB + B	
189.0E	25
B	
213.0	0

v. also 1860

814. (266)

B = $C_{14}H_{10}$

Phenanthrene

A	
115.0	100
A + B	
61.0E	30
B	
98.0	0

815. (266)

B = $C_{19}H_{16}$

Triphenylmethane

A	
115.0	100
A + B	
69.0E	22
B	
90.0	0

816. (266)

B = $C_{19}H_{16}O$

Triphenyl carbinol

A	
116.0	100
A + B	
93.0E	39
B	
161.0	0

v. also 123, 1860

C_6H_5Br
Bromobenzene

817. (364)

B = C_6H_5Cl

Chlorobenzene

°C Mix. t_L	°C Mix. t_S	Wt. % A
−28.1	−28.1	100
−30.5	−31.1	90
−33.1	−33.9	80
−35.0	−36.3	70
−36.8	−38.3	60
−38.7	−39.8	50
−40.1	−41.4	40
−41.2	−42.4	30
−42.3	−43.2	20
−43.3	−43.9	10
−44.0	−44.0	0

818. (364)

B = C_6H_5F

Fluorobenzene

Mixed crystals		
−28.1	−28.1	100
−35.3	−38.0	90
−42.5	−48.5	80
−49.7	−58.5	70
−57.0	−62.5	60
−62.5E	−62.5E	52.5
−57.2	−62.5	40
−53.1	−62.5	30
−48.9	−62.5	20
−44.7	−50.5	10
−40.5	−40.5	0

819. (364)

B = C_6H_5I

Iodobenzene

Mix.		
−28.1	−28.1	100
−29.6	−32.0	90
−32.1	−35.0	80
−35.5	−36.3	70
−36.5†	−36.5†	65
−35.5	−36.2	60
−32.9	−35.5	50
−31.7	−34.5	40
−31.0	−33.3	30
−30.4	−32.2	20
−29.7	−30.8	10
−29.0	−29.0	0

820. (428)

B = $C_6H_5NO_3$

o-Nitrophenol

°C	Wt. % A
44.9	0
42.5	5
40.1	10
35.6	20
31.3	30
26.2	40
20.6	50

821. (428)

B = $C_6H_5NO_3$

p-Nitrophenol

114.0	0
109.0	5
105.3	10
99.5	20
94.5	30
90.0	40
87.2	50

C_6H_5Br.—(*Continued*)

821.—(*Continued*)

°C	Wt. % A
83.7	60
78.0	70

v. also 677, 728

C_6H_5BrO

o-Bromophenol

822. *v.* p. 176

B = C_6H_5BrO

p-Bromophenol

C_6H_5Cl

Chlorobenzene

823. (364)

B = C_6H_5F

Fluorobenzene

°C Mixed crystals t_L	t_S	Wt. % A
−44.0	−44.0	100
−48.2	−52.0	90
−52.8	−60.8	80
−58.2	−71.0	70
−64.6	−71.0	60
−71.0E	−71.0E	52
−62.6	−71.0	40
−56.0	−71.0	30
−50.2	−64.5	20
−45.1	−50.5	10
−40.5	−40.5	0

824. (364)

B = C_6H_5I

Iodobenzene

Mix.		
−44.0	−44.0	100
−45.7	−47.9	90
−48.2	−49.7	80
−50.1	−50.7	70
−51.5†	−51.5†	57
−51.1	−51.2	50
−48.9	−49.6	40
−45.7	−47.4	30
−41.6	−44.5	20
−35.8	−39.9	10
−29.0	−29.0	0

825. *v.* p. 176

B = C_7H_5ClO

Benzoyl chloride

826. (364)

B = C_7H_5N

Cyanobenzene

Mixed crystals		
−44.0	−44.0	100
−48.4	−51.6	90
−54.4	−63.0	80
−63.7E	−63.7E	66.5
−56.1	−63.7	60
−45.5	−63.7	50
−36.5	−55.0	40
−28.9	−40.5	30
−22.4	−29.0	20
−16.9	−20.0	10
−12.1	−12.1	0

827. *v.* p. 176

B = $C_{10}H_8$

Naphthalene

827.1. (475)

B = $C_{10}H_9N$

α-Naphthylamine

°C	Mol % A
−4.0	80
+7.5	70
14.5	60
20.0?	50
24.0?	40
29.0?	30
37.4	20
43.2	10
46.3	5
49.4	0

827.2. (475)

B = $C_{10}H_9N$

β-Naphthylamine

4.5	97.5
27.0	95
43.5	90
61.0	80
71.0	70
79.0	60
85.5	50
91.0	40
96.0	30
100.5	20
105.0	10
108.0	5
110.6	0

828. (475)

B = $C_{12}H_9N$

Carbazole

°C	g B per 100 g A
20.0	0.55
30.0	0.76
40.0	1.07
50.0	1.45
60.0	2.0
70.0	2.75
80.0	3.7
100.0	7.0

829. *v.* p. 176

B = $C_{12}H_{10}$

Acenaphthene

830. *v.* p. 176

B = $C_{13}H_{10}$

Fluorene

831. *v.* p. 176

B = $C_{14}H_{10}$

Anthracene

832. *v.* p. 176

B = $C_{14}H_{10}$

Phenanthrene

v. also 290.1, 817

$C_6H_5ClN_2O_2$

1-Amino-2-nitro-4-chloroaniline

833. (62)

B = $C_6H_5ClN_2O_2$

1-Amino-3-nitro-4-chloroaniline

833.—(*Continued*)

°C	Mol % A
A	
115.7	100
A + B	
73.6E	45
B	
102.7	0

C_6H_5ClO

o-Chlorophenol

834. *v.* p. 176

B = C_6H_5ClO

p-Chlorophenol

835. (429)

B = C_6H_6

°C	Wt. % A
A	
+ 7.0	100
− 0.2	90
− 7.0	80
−13.3	70
A + B	
−19.5E	61.5
B	
−13.6	50
− 9.3	40
− 5.3	30
− 1.4	20
+ 2.2	10
5.4	0

836. (53)

B = C_6H_7N

Aniline

°C	Mol % A
A	
+ 8.0	100.0
A + AB	
− 1.75E	83.8
AB	
+29.4	**50.0**
AB + B	
−12.0E	9.7
B	
− 6.5	0.0

837. (53)

B = $C_8H_{11}N$

Dimethylaniline

A	
+ 8.0	100.0
A + AB	
− 2.8E	84.0
AB	
+16.7	**50.0**
AB + B	
− 4.5E	12.5
B	
+ 1.0	0.0

838. (53)

B = C_9H_7N

Quinoline

A	
+ 8.0	100.0
A + AB	
−10.9E	79.1

838.—(*Continued*)

°C	Mol % A
AB	
+47.4	**50.0**
AB + B	
−27.6E	9.6
B	
−19.5	0.0

839. (53)

B = $C_{13}H_{13}N$

Diphenyl-methylamine

A	
+ 8.0	100
A + B	
−29.1E	43.6
B	
− 9.6	0.0

v. also 370, 508

C_6H_5ClO

m-Chlorophenol

840. (429)

B = C_6H_6

°C	Wt. % A
A	
32.5	100
24.8	90
17.4	80
10.6	70
+5.0	60
−0.3	50
A + B	
−7.0E	39.7
B	
−4.0	30
−1.0	20
+2.3	10
5.4	0

C_6H_5ClO

p-Chlorophenol

841. (429)

B = C_6H_6

A	
41.0	100
33.0	90
25.5	80
18.9	70
12.6	60
+5.7	50
A + B	
−5.5E	37.5
B	
−3.3	30
−0.4	20
+2.5	10
5.4	0

v. also 834

$C_6H_5Cl_2N$

2, 4-Dichloroaniline

842. (138)

B = $C_{12}H_{11}N$

Diphenylamine

842.—(*Continued*)

°C	Wt. % A
A	
59.5	100
A + B	
30E *ca.*	44
B	
52.9	0

C_6H_5F

Fluorobenzene

843. (364)

B = C_6H_5I

Iodobenzene

°C Mixed crystals t_L	t_S	Wt. % A
−40.5	−40.5	100
−42 6	−47.0	90
−45.3	−53.5	80
−48.4	−60.0	70
−51.7	−60.5	60
−55.0	−60.5	50
−58.1	−60.5	40
−60.5E	−60.5E	32.5
−48.4	−53.0	20
−38.7	−41.0	10
−29.0	−29.0	0

v. also 818, 823

C_6H_5I

Iodobenzene

v. 819, 824, 843

C_6H_5IO

o-Iodophenol

844. *v.* p. 176

B = C_6H_5IO

p-Iodophenol

C_6H_5NO

Nitrosobenzene

845. (201)

B = $C_6H_5NO_2$

Nitrobenzene

°C	Wt. % A
A	
68.0	100
61.5	90
54.5	80
47.5	70
40.0	60
32.5	50
24.5	40
16.5	30
8.0	20
A + B	
0.0	10
B	
5.0	0

846. (220)

B = C_6H_7N

Aniline

°C	Mol % A
A	
63.5	100
59.0	90
53.9	80

846.—(*Continued*)

°C	Mol % A
A	
48.2	70
41.7	60
33.5	50
22.7	40
+ 7.8	30
A + B	
−13.0E	19
B	
− 9.5	10
− 6.0	0

$C_6H_5NO_2$

Nitrobenzene

848. *v.* p. 176

B = C_6H_6

850. *v.* p. 176

B = $C_6H_6N_2O_2$

o-Nitroaniline

851. *v.* p. 176

B = $C_6H_6N_2O_2$

m-Nitroaniline

852. *v.* p. 176

B = $C_6H_6N_2O_2$

p-Nitroaniline

853. *v.* p. 176

B = C_6H_6O

Phenol

854. (344)

B = $C_6H_6O_2$

Resorcinol

°C	Mol % A
110.4	0
104.5	10
98.0	20
90.8	30
83.4	40
75.6	50
67.2	60
57.7	70
46.0	80
29.0	90

855. (222)

B = C_6H_7N

Aniline

A	
+ 2.8	100.0
− 6.1	86.3
−14.7	69.5
−20.4	57.0
−24.1	50.6
A + B	
−29.8E	41.0
B	
−22.3	28.9
−15.6	16.0
− 6.1	0.0

857. *v.* p. 176

B = C_7H_5ClO

Benzoyl chloride

858. *v.* p. 176

B = $C_7H_6O_2$

Benzoic acid

859. (430)
B = $C_7H_7NO_2$
o-Nitrotoluene

°C	Wt. % A
5.22	100
4.25	98
3.18	96
2.07	94
1.04	92
0.0	90

860. (430)
B = $C_7H_7NO_2$
p-Nitrotoluene

5.22	100
4.14	98
3.06	96
2.00	94
+0.95	92
−0.22	90

861. *v.* p. 176
B = $C_{10}H_8$
Naphthalene

862. (86, 413)
B = $C_{10}H_{20}O$
Menthol

°C	Mol % A
A	
5.7	100.0
2.9	93.7
A + B	
2.6E	91.2
B	
10.2	88
16.2	81.7
22.0	70.1
23.8	61.2
25.7	51.7
27.4	41.6
29.5	31.2
31.9	21.1
35.2	11.2
40.3	3.6
42.0	0.0

863. *v.* p. 177
B = $C_{12}H_9N$
Carbazole

864. *v.* p. 177
B = $C_{12}H_{10}$
Acenaphthene

865. (413)
B = $C_{12}H_{18}O_8$
Diethyl diacetyltartrate

A	
5.7	100.0
0.0	90.02
A + B	
− 1.65E	86.68
B	
+13.4	77.22
24.4	67.72
34.55	55.86
43.0	41.99
50.0	29.55

865.—(*Continued*)

°C	Mol % A
B	
56.0	18.21
60.9	9.57
67.0	0.0

866. *v.* p. 177
B = $C_{13}H_{10}$
Fluorene

867. *v.* p. 177
B = $C_{14}H_8O_2$
Anthraquinone

868. *v.* p. 177
B = $C_{14}H_{10}$
Anthracene

868.1. *v.* p. 177
B = $C_{14}H_{10}$
Phenanthrene

868.2. (48)
B = $C_{14}H_{14}N_2O_3$
p-Azoxyanisole

A	
5.4	100
A + B	
3.2E	96.9
B	
17.0	95
39.5	90
60.5	80
73.5	70
83.0	60
91.0	50
98.0	40
103.5	30
109.0	20
113.5	10
118.0	0

v. also 23, 242, 273, 290.2, 678, 729, 805, 820, 845, 1860

$C_6H_5NO_3$
o-Nitrophenol

869. *v.* p. 177
B = $C_6H_5NO_3$
m-Nitrophenol
v. also 1861

870. *v.* p. 177
B = $C_6H_5NO_3$
p-Nitrophenol
v. also 1861

871. (48, 71)
B = C_6H_6

°C	Wt. % A
A	
44.0	100
40.3	95
37.0	90
30.5	80
24.1	70
18.5	60
12.5	50
+5.6	40
−1.5	30

871.—(*Continued*)

°C	Wt. % A
A	
−2.5	20
+1.6	10
3.5	5
5.5	0

872. (259)
B = C_6H_7N
Aniline

°C	Mol % A
A	
46.0	100.0
38.0	83.3
27.0	63.2
17.5	50.0
+10.0	39.4
− 2.5	26.1
A + B	
−13.5E	14.2
B	
−10.5	8.4
− 6.3	0.0

873. (247)
B = C_6H_7NO
m-Aminophenol

°C	Wt. % A
A	
44.5	100
A + B	
43.5E	98
B	
118.0	0

874. (257)
B = $C_6H_8N_2$
o-Phenylenediamine

A	
45.2	100
A + B	
38.8E	91
B	
53.5	80
64.0	70
72.0	60
78.3	50
83.5	40
88.2	30
92.5	20
96.7	10
101.0	0

875. (257)
B = $C_6H_8N_2$
m-Phenylenediamine

A	
45.0	100
39.0	90
35.7	80
A + B	
33.5E	67
B	
37.2	60
41.8	50
45.8	40
49.5	30
53.1	20

875.—(*Continued*)

°C	Wt. % A
B	
57.2	10
62.0	0

876. (257)
B = $C_6H_8N_2$
p-Phenylenediamine

A	
45.0	100
A + B	
42.5E	95.5
B	
61.8	90
85.0	80
98.5	70
107.8	60
114.8	50
120.5	40
125.3	30
130.0	20
134.8	10
140.0	0

877. (258)
B = $C_7H_6O_2$
m-Hydroxybenzaldehyde

A	
44.5	100
A + B	
41.0E	91
B	
105.0	0

878. (231)
B = C_7H_7NO
Benzamide

A	
44.8	100
A + B	
41.8E	95
B	
124.8	0

879. (428)
B = C_7H_8
Toluene

44.9	100
41.2	95
38.0	90
32.8	80
27.7	70
22.6	60
17.0	50
10.2	40
2.2	30

880. (208)
B = $C_7H_8O_2$
Dimethylpyrone

°C	Mol % A
A	
44.7	100
42.3	95
39.8	90
37.2	85
34.3	80

880.—(*Continued*)

°C	Mol % A
A + B	
33.0E	77.5
B	
39.0	75
51.8	70
63.5	65
73.9	60
83.0	55
90.2	50
97.3	45
103.0	40
108.0	35
112.2	30
116.1	25
119.8	20
123.2	15
126.3	10
132.1	0

881. *v.* p. 177
B = C_7H_9N
p-Toluidine

882. (42)
B = $C_8H_7NO_4$
o-Nitrophenyl acetate

°C	Mol % A
A	
44.5	100
A + B	
14.0E	35
B	
37.5	0

883. (249)
B = C_8H_8O
Acetophenone

°C	Wt. % A
A	
44.5	100
A + B	
2.5E	47
B	
20.2	0

883.1. (274.1)
B = $C_9H_8O_2$
Cinnamic acid

A	
44.5	100
A + B	
42.0E	89.0
B	
133.0	0

884. *v.* p. 177
B = $C_{10}H_8$
Naphthalene

885. *v.* p. 177
B = $C_{10}H_9N$
α-Naphthylamine

886. *v.* p. 177
B = $C_{10}H_9N$
β-Naphthylamine

887. (108, 253)
B = $C_{10}H_{16}O$
Camphor

°C	Mol % A
A	
45.0	100
A + B	
12.0E	45
B	
178.0	0

888. (234)
B = $C_{10}H_{16}O$
Fenchone

°C	Wt. % A
A	
+44.5	100
A + B	
extp. − 5.0E	92
B	
vis.	30 to 15
+ 5.3	0

889. (36)
B = $C_{10}H_{18}O$
Cineole

A	
+44.0	100
A + B	
− 6.0E	13
B	
+ 1.0	0

890. (238)
B = $C_{11}H_{12}N_2O$
Antipyrine

A	
43.5	100
A + B	
13.0E	53
B	
109.8	0

891. *v.* p. 177
B = $C_{12}H_9N$
Carbazole

892. (239)
B = $C_{12}H_{10}$
Acenapthene

°C	Wt. % A
A	
44.5	100
A + B	
32.0E	77
B	
90.5	0

892.1 (274.2)
B = $C_{12}H_{10}N_2$
Azobenzene

A	
44.0	100
A + B	
29.0E	60.0
B	
67	0

$C_6H_5NO_3$.—(Continued)

893. (138, 261)
B = $C_{12}H_{11}N$
Diphenylamine

°C	Wt. % A
A	
44.5	100
A + B	
21.0E	51
B	
53.1	0

894. (274)
B = $C_{13}H_{10}O$
Benzophenone

°C	Wt. % A
A	
45.0	100
A + B	
16.0E	45
B	
47.0	0

894.1. (234.1)
B = $C_{13}H_{12}O$
Benzhydrol

°C	Wt. % A
A	
44.5	100
A + B	
29.0E	61.0
B	
64.5	0

895. (252)
B = $C_{14}H_{10}$
Anthracene

°C	Wt. % A
A	
44.5	100
A + B	
44.0E	98
B	
66.5	95
93.0	90
125.0	80
144.0	70
158.0	60
170.0	50
180.0	40
189.5	30
197.5	20
205.0	10
212.0	0

896. (254)
B = $C_{19}H_{16}$
Triphenylmethane

°C	Wt. % A
A	
45.0	100
A + B	
36.0E	70
B	
91.0	0

898. (243)
B = $C_{19}H_{16}O$
Triphenyl carbinol

°C	Wt. % A
A	
44.7	100
A + B	
41.0E	90

898.—(*Continued*)

°C	Wt. % A
B	
159.5	0

v. also 124, 243, 295, 321, 371, 441, 459.2, 477, 497, 586, 772, 1860, 1861

$C_6H_5NO_3$
m-Nitrophenol

899. *v.* p. 177
B = $C_6H_5NO_3$
p-Nitrophenol
v. also 1861

900. (48, 71)
B = C_6H_6

°C	Wt. % B
95.2	0
91.0	5
87.7	10
82.0	20
77.8	30
75.4	40
73.5	50
71.0	60
68.3	70
63.5	80
52.0	90
39.5	95
15.0	99
0.0	99.5

901. (259)
B = C_6H_7N
Aniline

°C	Mol % A
A	
96.0	100.0
82.0	80.5
60.0	62.2
36.0	51.1
A + AB	
ca. 23.0U	45.0
AB	
22.5	43.2
20.5	39.3
13.0	31.5
+ 6.5	27.6
AB + B	
−15E	20
B	
−10.0	9.7
− 7.0	2.7
− 6.3	0.0

902. (247)
B = C_6H_7NO
m-Aminophenol

°C	Wt. % A
A	
94.5	100
A + B	
66.0E	66
B	
118.5	0

903. (257)
B = $C_6H_8N_2$
o-Phenylenediamine

°C	Wt. % A
A	
95.0	100
85.3	90
A + A_2B	
73.5E	81.5
A_2B	
73.9	**72**
69.8	60
A_2B + AB	
63.2U	55
AB + B	
63.1E	47
B	
73.3	40
82.3	30
89.9	20
95.8	10
101.0	0

904. (257)
B = $C_6H_8N_2$
m-Phenylenediamine

°C	Wt. % A
A	
95.0	100
91.3	90
A + A_2B	
71.0E	82
A_2B	
74.5	**72**
A_2B + AB	
74.0E	68
AB	
74.4	60
80.3	**56.3**
79.8	50
84.1	40
72.9	30
AB + AB_4	
52.0U	22.5
AB_4 + B	
51.0E	18
B	
56.2	9.6
62.1	0

905. (257)
B = $C_6H_8N_2$
p-Phenylenediamine

°C	Wt. % A
A	
95.0	100
A + A_2B	
93.2E	97
A_2B	
121.5	90
135.4	80
137.8	**72**
133.6	60
124.7	50
A_2B + AB_2	
112.0U	39.2
AB_2 + B	
111.0E	35.5

905.—(*Continued*)

°C	Wt. % A
B	
127.3	20
134.0	10
140.0	0

906. (231)
B = C_7H_7NO
Benzamide

°C	Wt. % A
A	
95.0	100
A + AB	
38.7E	63
AB + B	
38.7U	57
B	
124.8	0

907. (428)
B = C_7H_8
Toluene

°C	Wt. % B
95.2	0
91.2	5
88.0	10
82.5	20
78.3	30
76.0	40
74.5	50
73.0	60
71.0	70
67.5	80
56.0	90
42.0	95

908. (208)
B = $C_7H_8O_2$
Dimethylpyrone

°C	Mol % A
A	
95.3	100
92.5	95
88.1	90
82.2	85
73.9	80
63.4	75
50.6	70
A + AB	
44.0E	67
AB	
60.2	60
66.3	55
68.8	**50**
AB + B	
66.0E	42.3
B	
77.3	40
92.8	35
103.6	30
111.3	25
117.8	20
122.7	15
126.5	10
132.1	0

909. (256)
B = C_7H_9N
p-Toluidine

909.—(*Continued*)

°C	Wt. % A
A	
94.8	100
A + AB	
35.0E	64
AB	
36.5	**56**
AB + B	
23.0E	35
B	
42.5	0

910. (249)
B = C_8H_8O
Acetophenone

°C	Wt. % A
A	
+95.0	100
A + B	
−16.0E	41.5
B	
+20.5	0

910.1. (274.1)
B = $C_9H_8O_2$
Cinnamic acid

°C	Wt. % A
A	
95.0	100
A + AB?	
77.5E	?
AB?	
77.5	**74–61**
AB? + B	
77.5E	?
B	
133.0	0

911. (237)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Wt. % A
A	
96.0	100
90.7	90
83.1	80
74.5	70
64.8	60
A + AB	
56.0E	51.2
AB	
56.3	**50.7**
53.7	40
46.6	30
AB + B	
33.5E	16.5
B	
39.9	10
48.0	0

912. (237)
B = $C_{10}H_9N$
β-Naphthylamine

°C	Wt. % A
A	
96.0	100
91.6	90
84.0	80
73.7	70
A + AB	
61.5E	60.5

912.—(*Continued*)

°C	Wt. % A
AB	
64.3	**56**
AB + B	
64.2E	48.5
B	
75.7	40
87.0	30
95.2	20
102.5	10
109.0	0

913. (108, 253)
B = $C_{10}H_{16}O$
Camphor

°C	Mol % A
A	
95.5	100
A + B	
16.0E	41.5
B	
178.0	0

914. (36)
B = $C_{10}H_{18}O$
Cineole

°C	Wt. % A
A	
96	100
A + B	
−15.0E	23.5
B	
+ 1.0	0

915. (238)
B = $C_{11}H_{12}N_2O$
Antipyrine

°C	Wt. % A
A	
94.8	100
47.0	65.8
vis.	65.8 to 28.5
B	
42.8	28.5
109.8	0.0

916. *v.* p. 177
B = $C_{12}H_9N$
Carbazole

917. (239)
B = $C_{12}H_{10}$
Acenaphthene

°C	Wt. % A
A	
94.8	100
A + B	
73.5E	53.0
B	
90.5	0.0

917.1. (274.2)
B = $C_{12}H_{10}N_2$
Azobenzene

°C	Wt. % A
A	
95.0	100
A + B	
58.0E	24
B	
67	0

918. (261)
B = $C_{12}H_{11}N$
Diphenylamine

°C	Wt. % A
A	
94.5	100
A + B	
44.0E	18.0
B	
52.0	0.0

919. (274)
B = $C_{13}H_{10}O$
Benzophenone

A	
95.8	100
A + B	
12.0E	38.5
B	
47.0	0.0

920. (235)
B = $C_{13}H_{12}$
Diphenylmethane

A	
94.8	100
A + B	
22.0E	3.0
B	
24.0	0.0

920.1. (234.1)
B = $C_{13}H_{12}O$
Benzhydrol

A	
95.0	100
A + B	
38.0E	30.0
B	
64.5	0

921. (252)
B = $C_{14}H_{10}$
Anthracene

A	
95.5	100
A + AB	
93.0E	97
AB	
105.0	95
128.0	90
150.5	80
164.5	70
175.0	60
183.0	50
186.5	**43.5**
AB + B	
186.0E	41
B	
186.8	40
195.5	30
203.0	20
208.3	10
212.5	0

922. (254)
B = $C_{19}H_{16}$
Triphenylmethane

A	
96.0	100

922.—(*Continued*)

°C	Wt. % A
A + B	
80.0E	24
B	
91.0	0

923. (243)
B = $C_{19}H_{16}O$
Triphenyl carbinol

A	
95.5	100
A + A_2B	
84.0E	70
A_2B + B	
85.0U	60
B	
159.0	0

v. also 125, 296, 322, 372, 442, 458.3, 459.3, 478, 498, 587, 869, 1860, 1861

$C_6H_5NO_3$
p-Nitrophenol

924. (48, 71)
B = C_6H_6

°C	Wt. % A
114.0	100
108.0	95
103.7	90
97.7	80
94.0	70
91.5	60
89.0	50
86.0	40
83.0	30
78.5	20
68.5	10
56.0	5
20.0	1
8.0	0.5

925. (259)
B = C_6H_7N
Aniline

°C	Mol % A
A	
113.0	100.0
86.5	72.2
67.0	59.7
49.0	52.8
A + AB	
42.0UE	**50.0**
AB	
42.0	42.3
38.5	36.2
20.0	22.1
+ 4.0	16.0
AB + B	
−20.5E	10.5
B	
−17.5	9.3
−10.5	3.4
− 6.3	0.0

926. (247)
B = C_6H_7NO
m-Aminophenol

°C	Wt. % A
A	
111.5	100
A + AB	
81.0E	70
AB	
85.0	**56**
AB + B	
83.0E	51
B	
118.0	0

927. (257)
B = $C_6H_8N_2$
o-Phenylenediamine

A	
111.5	100
100.2	90
A + A_2B	
85.5E	81
A_2B	
87.9	**72**
82.7	60
71.7	50
A_2B + B	
68.0E	45.5
B	
73.5	40
82.3	30
90.0	20
96.0	10
101.0	0

928. (257)
B = $C_6H_8N_2$
m-Phenylenediamine

A	
111.5	100
A + A_2B	
102.0E	91
A_2B	
116.8	80
119.9	**72**
114.8	60
105.0	50
91.5	40
73.0	30
A_2B + B	
52.4E	20
B	
57.2	10
62.0	0

929. (257)
B = $C_6H_8N_2$
p-Phenylenediamine

A	
111.5	100
A + A_4B	
109.5E	98
A_4B	
129.0	90
134.2	**83.2**
126.5	70

929.—(*Continued*)

°C	Wt. % A
A_4B + AB	
117.4E	58
AB	
117.5	**56**
116.5	50
AB + B	
107.0E	38
B	
117.5	30
127.3	20
134.1	10
140.0	0

930. (258)
B = $C_7H_6O_2$
m-Hydroxybenz-aldehyde

A	
113.5	100
A + B	
65.8E	51
B	
105.0	0

931. (231)
B = C_7H_7NO
Benzamide

A	
112.0	100
A + AB	
81.6E	74
AB	
97.2	**53.4**
AB + B	
90.3E	36
B	
124.8	0

932. (428)
B = C_7H_8
Toluene

114.0	100
109.3	95
105.5	90
100.2	80
96.3	70
93.5	60
91.0	50
88.7	40
85.8	30
81.2	20
72.5	10
60.0	5

933. (208)
B = $C_7H_8O_2$
Dimethylpyrone

°C	Mol % A
A	
113.8	100
109.7	95
104.2	90
97.0	85
87.5	80
75.3	75

933.—(*Continued*)

°C	Mol % A
A + A_2B	
57.0E	70
A_2B	
58.2	**66.7**
A_2B + AB	
57.0E	62.2
AB	
68.5	55
72.3	**50**
70.3	45
AB + B	
68.0E	42
B	
92.8	35
103.5	30
111.5	25
118.0	20
123.0	15
126.7	10
132.1	0

934. (256)
B = C_7H_9N
p-Toluidine

°C	Wt. % A
A	
111.4	100
A + A_2B	
58.0U	67
A_2B + AB	
24.5U	44
AB + B	
20.0E	30
B	
42.5	0

935. (249)
B = C_8H_8O
Acetophenone

A	
+112.0	100
A + B	
− 4.0E	38
B	
+ 20.5	0

935.1. (274.1)
B = $C_9H_8O_2$
Cinnamic acid

A	
114.0	100
A + B	
83.0E	61.0
B	
133.0	0

936. (222)
B = $C_{10}H_8$
Naphthalene

°C	Mol % A
A	
113.0	100
107.3	90
101.7	80
96.2	70
91.6	60
86.8	50

936.—(*Continued*)

°C	Mol % A
A	
82.0	40
76.7	30
A + B	
74.0E	25
B	
74.6	20
77.0	10
80.1	0

937. (237)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Wt. % A
A	
112.0	100
105.8	90
97.0	80
86.2	70
73.0	60
A + AB	
66.0E	55.5
AB	
68.2	**49.3**
66.9	40
60.0	30
46.5	20
AB + B	
36.5E	14.5
B	
40.8	10
48.0	0

938. (237)
B = $C_{10}H_9N$
β-Naphthylamine

A	
112.0	100
103.5	90
94.5	80
84.3	70
A + AB	
78.0E	65
AB	
79.8	60
81.0	**49.3**
79.6	40
AB + B	
78.2E	36
B	
84.0	30
93.5	20
101.9	10
109.0	0

939. (108, 253)
B = $C_{10}H_{16}O$
Camphor

°C	Mol % A
A	
+114.1	100
A + B	
− 2.0E	36
B	
+178.0	0

$C_6H_5NO_3$.—(Continued)

940. (234)
B = $C_{10}H_{16}O$
Fenchone

°C	Wt. % A
+115.0	100
− 6.0	38.1
vis.	38.1 to 12.6
− 2.8	12.6
+ 5.3	0.0

941. (36)
B = $C_{10}H_{18}O$
Cineole

A	
+114.0	100
A + B	
− 16.0E	23
B	
+ 1.0	0

942. (238)
B = $C_{11}H_{12}N_2O$
Antipyrine

A	
111.5	100
A + A_2B	
67.0E	72
A_2B	
79.0	**59.6**
A_2B + AB	
78.5E	56.5
AB	
99.5	**42.5**
AB + AB_2	
80.0E	27
AB_2 + B	
79.0E	23
B	
109.8	0

943. *v.* p. 177
B = $C_{12}H_9N$
Carbazole

944. (239)
B = $C_{12}H_{10}$
Acenaphthene

°C	Wt. % A
A	
111.8	100
A + B	
80.0E	33
B	
90.5	0

944.1. (274.2)
B = $C_{12}H_{10}N_2$
Azobenzene

A	
113.5	100
A + B	
49.0E	10.0
B	
67	0

945. (261)
B = $C_{12}H_{11}N$
Diphenylamine

°C	Wt. % A
A	
111.5	100
A + B	
47.0E	10
B	
52.0	0

946. (274)
B = $C_{13}H_{10}O$
Benzophenone

A	
112.7	100
A + B	
17.0E	34
B	
47.0	0

947. (235)
B = $C_{13}H_{12}$
Diphenylmethane

A	
111.6	100
A + B	
23.0E	1
B	
23.9	0

947.1. (234.1)
B = $C_{13}H_{12}O$
Benzhydrol

A	
114.5	100
A + B	
36.0E	27.0
B	
6.45	0

948. *v.* p. 177
B = $C_{14}H_{10}$
Anthracene

949. (254)
B = $C_{19}H_{16}$
Triphenylmethane

°C	Wt. % A
A	
112.5	100
A + B	
86.0E	7.5
B	
91.0	0.0

950. (243)
B = $C_{19}H_{16}O$
Triphenyl carbinol

A	
111.5	100
A + B	
97.0E	63
B	
159.5	0

v. also 126, 244, 297, 323, 373, 443, 458.4, 459.4, 479, 499, 588, 821, 870, 899, 1860, 1861

$C_6H_5NO_4$
Nitrocatechol

951. (108)
B = $C_{10}H_{16}O$
Camphor

°C	Mol % A
A	
83.8	100
A + B	
26.0E	38
B	
178.0	0

$C_6H_5NO_4$
Nitroresorcinol

952. (108)
B = $C_{10}H_{16}O$
Camphor

A	
84.8	100
A + B	
46.3E	39.3
B	
178.0	0

$C_6H_5NO_4$
Nitrohydroquinol

953. (108)
B = $C_{10}H_{16}O$
Camphor

A	
131.3	100
A + B	
26.5E	33.2
B	
178.0	0

$C_6H_5N_3O_4$
2, 4-Dinitroaniline

954. *v.* p. 177
B = $C_6H_6N_2O_2$
o-Nitroaniline

955. *v.* p. 177
B = $C_6H_6N_2O_2$
p-Nitroaniline

C_6H_6

956. (427)
B = C_6H_6ClN
o-Chloroaniline

°C	Wt. % A
A	
5.5	100
+ 1.25	90
− 2.9	80
− 7.5	70
−12.2	60
−17.0	50
−22.5	40
A + B	
−25.0E	31.5
B	
−17.2	20
− 9.4	10
− 2.1	0

957. (427)
B = C_6H_6ClN
m-Chloroaniline

957.—(*Continued*)

°C	Wt. % A
A	
5.5	100
+ 1.1	90
− 3.4	80
− 8.0	70
−12.7	60
−17.5	50
−22.2	40
A + B	
−29.0E	24.5
B	
−25.8	20
−18.0	10
−10.4	0

958. (427)
B = C_6H_6ClN
p-Chloroaniline

A	
5.5	100
A + B	
1.5E	91.5
B	
12.7	80
22.2	70
30.7	60
38.2	50
44.8	40
50.9	30
56.8	20
63.1	10
70.5	0

959. (48, 427)
B = $C_6H_6N_2O_2$
o-Nitroaniline

A	
5.5	100
A + B	
2.5E	92
B	
21.0	80
32.4	70
38.9	60
43.5	50
47.5	40
50.8	30
55.8	20
62.8	10
71.1	0

960. (48, 427)
B = $C_6H_6N_2O_2$
m-Nitroaniline

A	
5.5	100
A + B	
5.3E	*ca.* 99.8
B	
40.0	95
52.0	90
69.5	80
77.2	70
82.0	60
85.8	50
89.4	40

960.—(*Continued*)

°C	Wt. % A
B	
93.7	30
98.6	20
105.5	10
114.6	0

961. (48, 427)
B = $C_6H_6N_2O_2$
p-Nitroaniline

A	
5.5	100
A + B	
5.4E	99.9
B	
81.0	95
92.5	90
105.0	80
111.5	70
115.3	60
118.3	50
121.1	40
125.0	30
131.0	20
138.5	10
147.0	0

962. *v.* p. 177
B = C_6H_6O
Phenol

963. (408)
B = C_6H_7N
Aniline

−6.0	0
−7.18	1
−8.0	2
−8.70	3
−9.30	4

964. (423.5)
B = C_6H_7NO
o-Aminophenol

177.0	0
170.0	10
165.0	20
161.5	30
158.5	40
155.8	50
153.2	60
149.8	70
145.0	80
134.0	90
120.0	95

965. (423.5)
B = C_6H_7NO
m-Aminophenol

B		
122.1	0.0	
116.4	8.2	
112.6	17.4	
Two liquid phases		
110.6 Trp.	30.6	83.5
118	45	76
119	46	74
120	47	73
121	48	69
122.3 crit.	60.0	

965.—(*Continued*)

°C	Wt. % A
B	
105.9	89.6
96.5	95.1

966. (423.5)
B = C_6H_7NO
p-Aminophenol

186.0	0
174.0	10
163.0	20
154.7	30
148.6	40
144.8	50
141.5	60
139.0	70
135.0	80
128.0	90
116.5	95

966.1. (426.1)
B = $C_6H_8N_2$
o-Phenylenediamine

B	
31.0	97.5
46.0	95
59.8	90
70.7	80
76.1	70
80.0	60
82.7	50
85.1	40
88.2	30
92.0	20
97.0	10
103.8	0

966.2. (426.1)
B = $C_6H_8N_2$
m-Phenylenediamine

B	
19.0	99
31.2	97.5
42.0	95
51.0	90
53.8	86 to 25
54.8	20
57.9	10
62.8	0
Immiscible liquids	
53.8	86 −25
60.0	80.4−29
65.0	74 −35
69.0 crit.	45

966.3. (426.1)
B = $C_6H_8N_2$
p-Phenylenediamine

B	
50 *ca.*	99
74.0	97.5
87.0	95
99.0	90
110.5	80
112.8	70
113.9	60
115.2	50
117.2	40

966.3.—(*Continued*)

°C	Wt. % A
B	
120.3	30
125.0	20
131.8	10
139.7	0

967. [325]
B = C_6H_{12}
Cyclohexane

A	
5.0	100
+ 1.6	95
− 1.4	90
− 6.9	80
−12.4	70
−18.4	60
−25.0	50
−32.2	40
−39.5	30
A + B	
−43.7E	24.2
B	
−33.8	20
−13.1	10
− 3.5	5
+ 6.2	0

968. *v.* p. 177
B = $C_6H_{12}O_3$
Paraldehyde

969. *v.* p. 177
B = C_7H_5ClO
Benzoyl chloride

970. [426]
B = $C_7H_5ClO_2$
o-Chlorobenzoic acid

140.3	0
134.0	5
128.5	10
113.0	30
106.0	40
99.0	50
92.0	60
84.5	70
75.0	80
58.5	90
41.0	95
5.5	100

971. [426]
B = $C_7H_6ClO_2$
m-Chlorobenzoic acid

154.5	0
148.0	5
142.5	10
133.0	20
124.5	30

971.—(*Continued*)

°C	Wt. % A
116.0	40
108.5	50
101.5	60
93.5	70
84.0	80
67.5	90
50.0	95
5.5	100

972. [426]
B = $C_7H_6ClO_2$
p-Chlorobenzoic acid

241.5	0
235.5	5
230.0	10
220.0	20
210.0	30
200.5	40
191.5	50
182.5	60
172.0	70
157.0	80
136.5	90
117.0	95
5.5	100

973. [425]
B = $C_7H_6NO_3$
o-Nitrobenzaldehyde

A	
5.5	100
+2.8	90
−0.3	80
A + B	
−2.0E	74.5
B	
+1.4	70
7.9	60
13.6	50
18.9	40
24.0	30
29.3	20
35.4	10
43.5	0

974. [425]
B = $C_7H_5NO_3$
m-Nitrobenzaldehyde

A	
5.5	100
A + B	
1.0E	84
B	
6.0	80
15.8	70
22.1	60
27.3	50
31.8	40
36.9	30
42.2	20
48.3	10
58.0	0

975. [425]
B = $C_7H_6NO_3$
p-Nitrobenzaldehyde

°C	Wt. % A
A	
5.5	100
A + B	
4.1E	96.4
B	
30.3	90
47.8	80
57.8	70
65.2	60
71.5	50
77.0	40
82.5	30
88.6	20
96.0	10

976. [426]
B = $C_7H_5NO_4$
o-Nitrobenzoic acid

146.8	0
141.5	5
136.5	10
127.5	20
120.5	30
116.0	40
113.0	50
110.0	60
106.5	70
101.0	80
90.5	90
78.5	95
5.5	100

977. [426]
B = $C_7H_6NO_4$
m-Nitrobenzoic acid

141.4	0
135.5	5
130.5	10
121.3	20
114.0	30
107.5	40
102.0	50
96.0	60
89.0	70
81.0	80
65.5	90
48.0	95
5.5	100

978. [426]
B = $C_7H_6NO_4$
p-Nitrobenzoic acid

242.4	0
236.5	5
230.5	10
220.0	20
210.5	30
204.5	40
201.5	50

978.—(*Continued*)

°C	Wt. % A
199.5	60
194.0	70
182.5	80
165.5	90
5.5	100

979. *v.* p. 177
B = $C_7H_6ClNO_2$
Nitrobenzyl chloride

980. *v.* p. 177
B = $C_7H_6N_2O_4$
2, 4-Dinitrotoluene

981. *v.* p. 177
B = $C_7H_6N_2O_4$
2, 6-Dinitrotoluene

982. *v.* p. 177
B = $C_7H_6N_2O_4$
3, 4-Dinitrotoluene

982.1. [422]
B = $C_7H_6O_2$
o-Hydroxybenzaldehyde

°C	Wt. % A
A	
5.32	100
3.7	95
+ 1.3	90
− 3.0	80
− 7.5	70
−12.7	60

982.2. [422]
B = $C_7H_6O_2$
m-Hydroxybenzaldehyde

B	
66.5	90
73.3	80
76.9	70
79.1	60
80.9	50
83.0	40
86.0	30
91.0	20
98.0	10
106.0	0

982.3. [422]
B = $C_7H_6O_2$
p-Hydroxybenzaldehyde

B	
70.0	95
80.5	90
84.0	80
86.2	70
88.0	60
90.5	50
94.0	40
99.0	30
104.5	20
110.0	10
116.0	0

983. [76.5]
B = $C_7H_6O_2$
Benzoic acid

°C	Wt. % A
A	
5.5	100
A + B	
4.3E	94.9
B	
22.9	90
42.5	80
55.5	70
65.9	60
75.0	50
83.8	40
92.3	30
101.5	20
110.9	10
121.7	0

985. [316, 426]
B = $C_7H_6O_3$
Salicylic acid

°C	Wt. % B
159.0	100
147.0	90
140.0	80
133.5	70
127.5	60
120.5	50
113.5	40
106.0	30
97.5	20
84.0	10
67.0	5
25.0	0.91

987. [326]
B = $C_7H_6O_3$
m-Hydroxybenzoic acid

201.3	100
196.0	90
191.0	80
187.0	70
185.0	60
184.0	50
182.0	40
178.0	30
171.0	20
161.5	10
154.0	5

989. [426]
B = $C_7H_6O_3$
p-Hydroxybenzoic acid

213.0	100
209.0	90
205.0	80
201.5	70
198.5	60
196.5	50
195.5	40
194.5	30
191.0	20
177.5	10
164.0	5

991. *v.* p. 177
B = C_7H_7Br
p-Bromotoluene

992. *v.* p. 177
B = C_7H_8
Toluene

993. [424]
B = $C_8H_6O_3$
o-Aldehydobenzoic acid

°C	Wt. % B
100.5	100
90.0	90
83.0	80
79.3	70
77.0	60
75.5	50
74.5	40
73.5	30
71.7	20
66.5	10

994. [424]
B = $C_8H_6O_3$
m-Aldehydobenzoic acid

175.0	100
166.0	90
158.5	80
152.8	70
150.2	60
149.7	50
149.6	40

995. [424]
B = $C_8H_6O_3$
p-Aldehydobenzoic acid

250.0	100
170.0	2
110.0	1

996. [427]
B = C_8H_8ClNO
o-Chloroacetanilide

86.7	100
78.0	90
70.0	80
62.7	70
55.9	60
49.9	50
44.1	40
37.5	30
29.5	20
11.0	10

997. [427]
B = C_8H_8ClNO
m-Chloroacetanilide

76.6	100
68.0	90
60.0	80
52.7	70
46.8	60
40.9	50
34.3	40
27.0	30
15.4	20

C_6H_6.—(Cont'd)

998. (427) B = C_8H_8ClNO *p*-Chloroacetanilide

°C	Wt. % B
178.4	100
169.5	90
162.0	80
154.8	70
147.5	60
141.0	50
135.5	40
130.5	30
124.5	20
114.5	10
100.5	5

999. (427) B = $C_8H_8N_2O_3$ *o*-Nitroacetanilide

°C	Wt. % B
93.0	100
83.0	90
77.0	80
72.8	70
69.5	60
66.3	50
62.5	40
58.0	30
50.3	20
38.5	10

1000. (427) B = $C_8H_8N_2O_3$ *m*-Nitroacetanilide

°C	Wt. % B
154.5	100
140.0	90
133.9	80
129.1	70
125.5	60
124.0	50
122.3	40
120.0	30
116.5	20
99.8	10

1001. (427) B = $C_8H_8N_2O_3$ *p*-Nitroacetanilide

°C	Wt. % B
215.9	100
200.5	90
190.5	80
184.8	70
181.6	60
179.5	50
178.0	40
177.0	30
174.0	20
163.0	10
149.5	5

1002. (54) B = C_8H_8O Acetophenone

°C	Wt. % A
A	
+5.5	100
A + B	
−16.7E	53
B	
+19.2	0

1002.1. (422) B = $C_8H_8O_2$ 1-Aldehydo-2-hydroxy-5-methylbenzene

°C	Wt. % A
A	
5.32	100
4.1	95
+ 2.1	90
− 1.8	80
B	
+ 2.5	70
10.2	60
17.8	50
25.0	40
31.0	30
37.5	20
45.8	10
55.1	0

1002.2. (422) B = $C_8H_8O_2$ 1-Aldehydo-4-hydroxy-5-methylbenzene

°C	Wt. % A
B	
60.0	95
71.0	90
76.5	80
80.8	70
83.9	60
86.3	50
90.4	40
96.0	30
102.5	20
110.0	10
117.4	0

1002.3. (422) B = $C_8H_8O_2$ 1-Aldehydo-4-hydroxy-6-methylbenzene

°C	Wt. % A
B	
55.0	95
70.0	90
73.0	80
75.0	70
77.0	60
80.0	50
83.5	40
88.0	30
94.0	20
101.0	10
108.9	0

1002.4. (71.1) B = C_8H_9NO Acetanilide

°C	g B per 100 g A
7.0	0.50
25.0	1.31
55.2	18.5

1003. *v.* p. 177 B = C_8H_{10} *p*-Xylene

1003.1. (426.1) B = $C_8H_{10}N_2O$ Monoacetyl-*o*-phenylenediamine

°C	Wt. % A
B	
33.0	95
50.3	90
73.0	80
87.0	70
97.0	60
105.5	50
113.5	40
121.4	30
129.1	20
136.8	10
144.8	0

1003.2. (426.1) B = $C_8H_{10}N_2O$ Monoacetyl-*m*-phenylenediamine

°C	Wt. % A
B	
54.0	97
83.0	95
145.0	90
184.9	84–22.5
190	20
201	15
217	10
243	5
279	0
Immiscible liquids	
184.9	84 −22.5
200.0	82 −25.2
220	78.8–29.4
240	74.2–34.8
260	64.5–44.8
266 crit.	55

1003.3. (426.1) B = $C_8H_{10}N_2O$ Monoacetyl-*p*-phenylenediamine

°C	Wt. % A
B	
116.2	92.85
146.8	? −27.0
149.2	20
154.2	10
160.5	0
Immiscible liquids	
146.8	? −27.0
170	? −39.5
180	83.5–47.0
188 crit.	*ca.* 67.0

1004. B = $C_8H_{10}N_4O_2$ Caffeine *v.* Seidell, p. 186

1005. *v.* p. 177 B = $C_{10}H_8$ Naphthalene

1006. (278) B = $C_{10}H_8O$ β-Naphthol

°C	Mol % A
A	
5.02	100
A + B	
4.33E	98.97
B	
12.0	98.17
32.5	96.4
67.0	85.4
71.5	82.2
77.4	74.9
87.0	60.7
89.8	55.2
95.3	49.2
106.5	28.4
112.5	21.0
121.0	0

1006.1. (475) B = $C_{10}H_9N$ α-Naphthylamine

°C	Mol % A
5.4	100
4.7	97.5
3.7	95
+1.4	90
−4.5	80
+7.7	70
15.0	60
21.7	50
27.6	40
32.5	30
37.5	20
43.3	10
46.4	5
49.4	0

1006.2. (475) B = $C_{10}H_9N$ β-Naphthylamine

°C	Mol % A
5.4	100
14.0	97.5
31.0	95
48.5	90
63.6	80
75.0	70
82.0	60
110.6	0

1007. (482) B = $C_{10}H_{14}N_2$ Nicotine

°C	Mol % A
A	
+ 5.0	100.00
− 7.2	82.36
− 9.9	77.3
−17.5	64.53
−46.8	39.5

1008. *v.* p. 177 B = $C_{10}H_{16}$ Camphene

1008.1. (71.1) B = $C_{10}H_{16}O$ Camphor

°C	g B per 100 g A
4.0	224.0
25.0	257.0
56.0	357.0

1009. (86) B = $C_{10}H_{20}O$ Menthol

°C	Mol % A
A	
5.34	100.00
+2.42	92.22
−0.28	81.16
A + B	
−3.4E	70.0
B	
0.0	62.17
+5.4	53.62
9.9	46.99
18.1	34.99
24.7	25.66
29.7	18.28
35.9	8.87
41.9	0.00

1010. (475) B = $C_{12}H_9N$ Carbazole

°C	g B per 100 g A
10.0	0.52
20.0	0.66
30.0	0.92
40.0	1.28
50.0	1.75
60.0	2.30
70.0	3.05
80.0	4.1

1011. *v.* p. 177 B = $C_{12}H_{10}$ Diphenyl

1012. *v.* p. 177 B = $C_{12}H_{11}N$ Diphenylamine

1013. *v.* p. 177 B = $C_{12}H_{12}N_2$ Hydrazobenzene

1014. *v.* p. 177 B = $C_{13}H_{10}$ Fluorene

1015. (292) B = $C_{13}H_{12}O$ Benzhydrol

°C	Wt. % A
A	
5.5	100
4.6	95
3.6	90
A + AB	
1.5E	80
AB	
9.9	70
19.8	60
27.5	50
AB + B	
29.5U	45
B	
33.6	40
41.7	30
49.8	20
57.8	10
65.9	0

1016. *v.* p. 177 B = $C_{14}H_8O_2$ Anthraquinone

1017. *v.* p. 177 B = $C_{14}H_{10}$ Anthracene

1018. *v.* p. 178 B = $C_{14}H_{10}$ Phenanthrene

1018.1. (71.1) B = $C_{14}H_{10}O_2$ Benzil

°C	g B per 100 g A
4.5	28.8
25.0	59.0
64.2	269.0

1019. (48) B = $C_{14}H_{14}N_2O_3$ *p*-Azoxyanisole

°C	Mol % A
A	
5.5	100
A + B	
4.7E	98.6
B	
23.0	98
40.5	95
55.5	90
72.0	80
81.5	70
88.5	60
94.0	50
99.0	40
104.0	30
109.0	20
113.5	10
118.0	0

1020. *v.* p. 178 B = $C_{14}H_{16}N_2$ Hydrazotoluene

1021. *v.* p. 178 B = $C_{14}H_{16}N_2O_2$ Hydrazoanisole

1022. (279) B = $C_{16}H_{11}N_3O_7$ β-Naphthalene picrate

5.02	100
30	99
100	90
120	71
140	39
157	0

1023. (292)
B = $C_{17}H_{22}N_2O$
Tetramethyldiaminobenzhydrol

°C	Wt. % A
A	
5.5	100
AB	
24.2	80
32.8	70
39.7	60
44.8	50
AB + B	
50.0U	38
B	
62.4	30
76.7	20
88.9	10
98.5	0

1024. (147, 278, 305)
B = $C_{19}H_{16}$
Triphenylmethane

°C	Mol % A
A	
5.05	100
A + AB	
4.2E	98.75
AB	
8.2	98.72
13.3	98.37
24.5	98.03
40.0	95.14
52.1	90.0
60.6	84.9
71.0	73.2
74.7	67.5
78.2	**50.0**
77.1	41.0
AB + B	
74.0E	30.6
B	
77.6	26.5
83.5	17.9
87.3	10.4
92.5	0

1026. (191, 192)
B = $C_{20}H_{24}N_2O_2$
Quinine

°C	Wt. % A
A	
5.5	100
A + AB	
5.3	99.7
B	
174.7	0

v. also 7.1, 24, 33, 44, 87, 127, 192, 245, 257, 274, 392, 405, 423, 426, 429, 500, 506, 509, 589, 664, 669, 671, 679, 688, 693, 697, 709, 730, 755, 771, 773, 795, 796, 797, 835, 840, 841, 848, 871, 900, 924

C_6H_6ClN
Chloroanilines
956, 957, 958

$C_6H_6N_2O$
p-Nitrosoaniline

1027. (201, 202)
B = $C_6H_6N_2O_2$
p-Nitroaniline

°C	Wt. % A
A	
169.0	100
A + B	
120.0E	41
B	
147.0	0

$C_6H_6N_2O_2$
o-Nitroaniline

1028.
B = $C_6H_6N_2O_2$
m-Nitroaniline
v. 1862

1029.
B = $C_6H_6N_2O_2$
p-Nitroaniline
v. 1862

1029.1. (73)
B = C_8H_{10}
m-Xylene

°C	g A per 100 g B
15.0	11.6

1030. (101)
B = $C_{10}H_{16}O$
Camphor

°C	Mol % A
A	
69.4	100
A + B	
6.0E	50.5
B	
178.0	0

v. also 542, 850, 954, 959, 1862

$C_6H_6N_2O_2$
m-Nitroaniline

1031.
B = $C_6H_6N_2O_2$
p-Nitroaniline
v. 1862

1032. (203)
B = $C_7H_5N_5O_8$
Trinitrophenylmethylnitroamine (Tetryl)

°C	Wt. % A
A	
113.0	100
A + AB	
83.0E	58

1032.—(*Continued*)

°C	Wt. % A
AB	
85.0	**32**
AB + B	
84.0E	27
B	
127.5	0

1033. *v.* p. 178
B = C_8H_9NO
Acetanilide

1033.1. (73)
B = C_8H_{10}
m-Xylene

°C	g A per 100 g B
15.0	1.74

1034. (393, 394)
B = $C_{10}H_8$
Naphthalene

°C	Mol % A
A	
110.0	100
A + B	
68.0E	24
B	
80.0	0

1035. (101)
B = $C_{10}H_{16}O$
Camphor

°C	
A	
114.0	100
A + B	
51.0E	31.4
B	
178.0	0

v. also 543, 557, 732, 851, 960, 1028, 1862

$C_6H_6N_2O_2$
p-Nitroaniline

1036. (203)
B = $C_7H_5N_5O_8$
Trinitrophenylmethylnitroamine (Tetryl)

°C	Wt. % A
A	
147.5	100
A + AB	
89.0E	60
AB	
100.0	**32**
AB + B	
97.0E	28
B	
127.5	0

1036.1. (73)
B = C_8H_{10}
m-Xylene

°C	g A per 100 g B
15.0	0.28

1037. (100)
B = $C_{10}H_{16}O$
Camphor

°C	Mol % A
A	
147.4	100
A + B	
76.0E	31
B	
178.0	0

v. also 558, 852, 955, 961, 1027, 1029, 1031, 1862

C_6H_6O
Phenol

1041. (418, 470)
B = C_6H_7N
Aniline

°C	Mol % A
A	
40.5	100
36.7	95
31.5	90
A + AB	
14.8E	78.8
AB	
22.3	70
28.6	60
30.6	**50**
29.9	55
29.7	45
28.5	40
22.0	30
+10.1	20
− 6.5	10
AB + B	
−11.7E	7.7
B	
− 9.7	5
− 6.1	0

1042. (247)
B = C_6H_7NO
m-Aminophenol

°C	Wt. % A
A	
40.5	100
A + AB	
15.0E	69
AB	
76.0	**46**
AB + B	
75.0E	44
B	
118.0	0

1043. (247)
B = C_6H_7NO
p-Aminophenol

A	
40.5	100
A + B	
31.0E	87
126.0d	58.5

1044. (85)
B = $C_6H_8N_2$
Phenylhydrazine

°C	Mol % A
A	
40.5	100
A + AB	
18.0E	79.5
AB	
42.0	**50**
36.55	38.42

1045. (257)
B = $C_6H_8N_2$
o-Phenylenediamine

°C	Wt. % A
A	
40.5	100
32.2	90
A + A_4B	
28.0E	86
A_4B	
29	**80**
A_4B + AB	
28.8E	77.5
AB	
34.2	70
41.0	60
AB + B	
43.5U	53
B	
65.5	40
76.5	30
85.8	20
93.8	10
101.0	0

1046. (257)
B = $C_6H_8N_2$
m-Phenylenediamine

A	
40.5	100
30.7	90
A + A_3B_2	
24.0E	85
A_3B_2	
34.3	80
47.3	70
52.6	**56.6**
51.8	50
48.8	40
44.5	30
A_3B_2 + B	
41.0E	23
B	
54.0	10
62.0	0

1047. (257)
B = $C_6H_8N_2$
p-Phenylenediamine

A	
40.5	100
A + A_2B	
40.0E	98.5
A_2B	
56.0	95
76.5	90

1047.—(*Continued*)

°C	Wt. % A
A_2B	
96.5	80
103.9	70
104.9	**63.5**
99.6	50
A_2B + B	
94.0E	42
B	
111.7	30
122.8	20
131.7	10
140.0	0

1048. (292)
B = $C_6H_{10}O$
Cyclohexanone

A	
42.0	100
30.8	90
+16.0	80
−11.5	70
A + AB	
−36.0E	63.5
AB	
−22.5	**53**
−26.0	40
−38.5	30
−62.5	20

1049. (292)
B = $C_7H_5NO_3$
m-Nitrobenzaldehyde

°C	Mol % A
A	
+41.0	100
A + B	
−14.0E	59.8
B	
+55.5	0

1050. *v.* p. 178
B = $C_7H_6O_2$
m-Hydroxybenzaldehyde

1051. (292)
B = $C_7H_6O_2$
p-Hydroxybenzaldehyde

°C	Wt. % A
A	
41.0	100
34.8	90
27.2	80
A + B	
20.0E	72
B	
49.5	60
67.0	50
79.2	40
90.0	30
99.5	20
108.0	10
115.0	0

C_6H_6O.—(*Continued*)

1052. [375] B = C_7H_7Br *p*-Bromotoluene

°C	Wt. % A
A	
40.06	100
37.7	95
35.5	90
31.5	80
27.6	70
23.5	60
18.9	50
A + B	
13.5E	40.3
B	
16.65	30
19.4	20
22.0	10
23.75	5
26.74	0

1053. [267] B = C_7H_7NO Benzamide

A	
40.8	100
A + A_2B	
15.0E	74
A_2B + B	
22.5U	64
B	
124.0	0

1054. [90, 118, 454] B = C_7H_8O *o*-Cresol

Mix.	
40.5	100
37.9	95
35.2	90
29.5	80
23.4	70
19.9	60
19.85†	55
19.9	50
20.9	40
22.6	30
24.95	20
27.6	10
29.0	5
30.45	0

1055. [90, 118, 454] B = C_7H_8O *m*-Cresol

°C	Wt. % A
A	
40.5	100
38.3	95
36.2	90
31.7	80
27.3	70
22.8	60
A + AB_2	
20.2E	55.2
AB_2	
22.0	50
24.8	40
25.9	**30.4**
24.0	20
17.0	10
AB_2 + B	
7.3E	4.8
B	
10.0	0

v. also 1863

1056. [90, 118, 454] B = C_7H_8O *p*-Cresol

A	
40.5	100
37.2	95
33.9	90
26.9	80
18.9	70
+9.0	60
A + AB_2	
−1.5E	50.5
AB_2 + B	
+0.8U	41.3
B	
11.6	30
19.6	20
27.0	10
30.6	5
34.2	0

v. also 1863

1057. [208] B = $C_7H_8O_2$ Dimethylpyrone

°C	Mol % A
A	
42.4	100
37.2	95
27.9	90
A + A_2B	
7.0E	83.5
A_2B	
19.5	80
30.0	75
35.5	70
36.8	**66.7**
32.5	60
A_2B + B	
27.0E	55.5
B	
54.6	50
74.0	45
87.0	40
97.5	35
106.0	30
112.8	25
118.6	20
123.0	15
126.6	10
132.1	0

1058. [223] B = C_7H_9N *o*-Toluidine

°C	Mol % A
A	
41.0	100
36.7	95
30.0	90
A + AB	
12.0E	82
AB	
27.0	70
32.8	60
33.8	55
34.0	**50**
33.8	45
32.8	40
27.3	30
+14.0	20
−15.0	9

1059. [223] B = C_7H_9N *p*-Toluidine

A	
41.0	100
37.7	95
33.0	90
19.2	80
A + AB	
11.0E	75
AB	
18.5	70
27.1	60
28.7	55
29.0	**50**
28.4	45
26.0	40
AB + B	
18.5E	32
B	
31.0	20
38.4	10
40.6	5
42.5	0

1060. [249] B = C_8H_8O Acetophenone

°C	Wt. % A
A	
+41.0	100
A + B	
−52.0E	53
B	
+20.5	0

1061. [345] B = C_8H_9NO Acetanilide

°C	Mol % A
A	
40.5	100
37.5	95
33.0	90
+19.5	80
A + B	
− 6.0E	69
B	
+31.0	60
47.0	55
59.0	50
69.5	45
78.2	40
91.0	30
100.0	20
107.5	10
111.0	5
113.5	0

1062. [375, 377] B = C_8H_{10} *p*-Xylene

°C	Wt. % A
A	
40.24	100
37.4	95
34.6	90
28.9	80
23.3	70
18.1	60
12.8	50
7.6	40
A + B	
5.6E	36
B	
6.45	30
8.15	20
10.3	10
11.7	5
13.35	0

1063. [220] B = $C_8H_{10}N_2O$ Nitrosodimethylaniline

°C	Mol % A
A	
41.5	100
36.8	95
30.0	90
A + AB_2	
12.5E	80
AB_2	
59.5	70
79.0	60
87.0	50
89.1	45
90.7	40
91.5	**33**
90.5	30
88.2	25
84.7	20
79.8	15
AB_2 + B	
75.5E	12
B	
82.4	5
86.0	0

1064. [53, 223] B = $C_8H_{11}N$ Dimethylaniline

°C	Mol % A
A	
40.5	100
36.2	95
31.3	90
18.3	80
+ 0.5	70
−22.8	60
A + B	
−36.0E	54.8
B	
−30.8	50
−26.0	45
−21.5	40
−13.5	30
− 7.3	20
− 2.1	10
+ 0.2	5
2.0	0

1065. [223] B = $C_8H_{11}N$ *m*-Xylidine

A	
41.0	100
37.6	95
32.7	90
+17.2	80
A + AB	
− 1.0E	71
AB	
+12.7	60
15.3	55
16.0	**50**
15.3	45
13.2	40
+ 4.7	30
− 9.0	20

1066. [53] B = C_9H_7N Quinoline

A	
+41.0	100
A + A_2B	
− 0.7E	77.6
A_2B	
+ 7.2	**66.7**
A_2B + A_2B_3	
− 4.6E	57.5
A_2B_3	
+22.4	**40**
A_2B_3 + B	
−24.1E	5
B	
−19.5	0

1066.1. [274.1] B = $C_9H_8O_2$ Cinnamic acid

°C	Wt. % A
A	
40.5	100
A + B	
29.0E	85
B	
133.0	0

1067. [151, 345, 483] B = $C_{10}H_8$ Naphthalene

°C	Mol % A
A	
40.5	100
33.4	90
A + B	
29.8E	84
B	
46.7	70
53.7	60
58.8	50
63.4	40
67.3	30
71.3	20
75.3	10
80.1	0

1068. [381] B = $C_{10}H_9N$ α-Naphthylamine

A	
40.5	100
36.7	95
31.5	90
A + AB	
16.0E	77
AB	
21.3	70
26.9	60
28.2	55
28.6	**50**
28.2	45
28.0	40
AB + B	
24.0E	32
B	
34.3	20
42.0	10
45.4	5
48.3	0

1069. [223] B = $C_{10}H_9N$ β-Naphthylamine

A	
40.5	100
A + AB	
36.0E	96
AB	
54.5	90
71.7	80
78.8	70
82.6	60
83.3	55
83.5	**50**
AB + B	
83.0E	42.5
B	
84.7	40
91.5	30
98.0	20
104.0	10
106.7	5
109.0	0

1070. (375)
B = $C_{10}H_{14}O$
Thymol

°C	Wt. % A
A	
39.53	100.00
36.20	93.31
31.58	84.52
25.82	75.28
12.90	58.49
9.08	53.59
A + B	
7.49E	51.83
B	
8.29	49.69
19.17	39.45
25.09	30.83
33.64	20.54
40.52	10.65
49.24	0.00

1071. (268, 481)
B = $C_{10}H_{16}O$
Camphor

A	
40.5	100
37.0	95
33.2	90
25.0	80
+11.0	70
−15.0	60
A + AB	
−30.0E	56
AB	
−24.5	50
−18.6	**36**
AB + B	
−22.0E	29
B	
+15.0	25
58.0	20
94.0	15
128.0	10
156.0	5
178.0	0

1072. (234)
B = $C_{10}H_{16}O$
Fenchone

A	
41.0	100
No solid phase	
−2.0 to −14.0	90.8 to 43.8
B	
5.3	0

1073. (36)
B = $C_{10}H_{18}O$
Cineole

A	
+42.5	100
A + AB	
−13.0E	55
AB	
− 8.0	**38**
AB + B	
−14.0E	17

1073.—(*Continued*)

°C	Wt. % A
B	
+ 1.0	0

1074. (238)
B = $C_{11}H_{12}N_2O$
Antipyrine

A	
41.0	100
No solid phase	
11 to 16.5	76.2 to 54
AB	
55.5	**33**
AB + B	
52.5E	27
B	
109.8	0

1075. (381)
B = $C_{12}H_{11}N$
Diphenylamine

°C	Mol % A
A	
36.8	95.5
30.3	86.9
24.6	78
19.8	70.7
A + B	
18.1E	69
B	
25.0	57.2
32.0	44.3
37.1	34.1
44.1	18.4
48.2	9.3
52.6	0.0

1076. (413)
B = $C_{12}H_{18}O_8$
Diethyl diacetyl-tartrate

A	
40	100
33.9	94.61
24.6	89.04
18.6	85.95
+11.1	82.60
− 3.6	76.98
A + B	
−24.15E	71.20
B	
− 4.6	66.31
+17.25	58.37
31.9	48.64
46.2	35.48
51.0	27.82
55.7	19.70
58.6	14.26
62.7	6.12
67.0	0

1077. (262)
B = $C_{13}H_9N$
Acridine

°C	Wt. % A
A	
40.5	100

1077.—(*Continued*)

°C	Wt. % A
A + A_2B	
36.0E	93.5
A_2B	
42.0	90
60.0	80
74.0	70
83.5	60
87.0	**51**
A_2B + A_2B_3	
83.0E	45
A_2B_3	
90.0	40
101.0	**26**
98.0	20
A_2B_3 + B	
87.5E	13
B	
92.0	10
99.0	5
106.5	0

1078. (274)
B = $C_{13}H_{10}O$
Benzophenone

A	
+40.8	100
A + AB	
−13.0E	52
AB	
− 3.0	**34**
AB + B	
− 4.5E	30
B	
+47.0	0

1079. (375)
B = $C_{13}H_{12}$
Diphenylmethane

A	
40.24	100.00
16.73	51.08
12.94	43.43
A + B	
11.52E	36.68
B	
13.24	31.56
16.49	20.73
18.40	14.24
20.72	8.08
24.45	0.00

1080. (234.1, 292)
B = $C_{13}H_{12}O$
Benzhydrol

A	
41.5	100
A + A_2B	
30E	81
A_2B	
47.3	**50.5**
A_2B + B	
37E	27
B	
64.5	0

1081. (53)
B = $C_{13}H_{13}N$
Diphenyl-methylamine

°C	Mol % A
A	
+41.0	100
A + B	
−18.1E	25
B	
− 9.6	0

1082. (254)
B = $C_{19}H_{16}$
Triphenylmethane

°C	Wt. % A
A	
41.0	100
A + B	
31.0E	74
B	
91.0	0

1083. (271)
B = $C_{19}H_{16}O$
Triphenyl carbinol

A	
41.0	100
A + B	
32.0E	78
B	
159.3	0

v. also 76, 128, 193, 220, 246, 275, 298, 313, 323.1, 374, 393, 401, 402, 444, 458.5, 459.5, 480, 510, 591, 853, 962, 1852, 1860, 1863

$C_6H_6O_2$

Catechol

1084. (195, 420)
B = $C_6H_6O_2$
Resorcinol

°C	Mol % A
A	
103.5	100.0
100.0	94.2
90.0	78.5
80.0	64.5
70.0	53.2
A + B	
64.0E	47.0
B	
70.0	42.7
80.0	35.2
90.0	26.7
100.0	15.8
109.5	0.0

v. also 1864, 1865

1085. (195, 420)
B = $C_6H_6O_2$
Hydroquinol

A	
103.5	100.0
100.0	94.4
90.0	79.4

1085.—(*Continued*)

°C	Mol % A
A + B	
88.5E	77.0
B	
100.0	73.0
110.0	68.2
120.0	63.3
130.0	57.0
140.0	49.0
150.0	36.4
160.0	10.7
170.5	0.0

v. also 1864, 1866

1086. (259)
B = C_6H_7N
Aniline

A	
105.0	100.0
100.0	91.6
91.5	79.5
82.5	70.6
68.0	59.1
56.0	53.3
A + AB	
39.0U	46.5
AB	
37.0	40.9
26.0	29.9
+ 4.8	20.5
AB + B	
−14.0	11.5
− 9.0	5.0
− 6.3	0.0

1087. (247)
B = C_6H_7NO
m-Aminophenol

°C	Wt. % A
A	
101.5	100
A + B	
66.0E	54
B	
118.0	0

1088. (264)
B = $C_6H_8N_2$
o-Phenylenediamine

A	
102.7	100
A + AB	
76.0E	72
AB	
84.5	**50**
AB + B	
76.0E	30
B	
98.8	0

1089. (264)
B = $C_6H_8N_2$
m-Phenylenediamine

A	
102.7	100
A + AB	
56.0E	57

1089.—(*Continued*)

°C	Wt. % A
AB	
64.5	**50**
AB + B	
41.0E	16
B	
62.0	0

1090. (264)
B = $C_6H_8N_2$
p-Phenylenediamine

A	
102.8	100
A + A_3B_2	
87.5E	85
A_3B_2	
108.0	**60.4**
A_3B_2 + B	
99.0E	35
B	
138.0	0

1091. *v.* p. 178
B = $C_7H_6O_2$
m-Hydroxybenz-aldehyde

1092. (231)
B = C_7H_7NO
Benzamide

A	
102.8	100
A + B	
38.0E	50.5
B	
124.0	0

1093. (383)
B = C_7H_9N
p-Toluidine

°C	Mol % A
A	
103.2	100
A + AB	
49.8E	54
AB	
50.2	**50**
AB + AB_2	
41.4E	34.5
AB_2	
41.4	**33**
AB_2 + B	
32.6E	16.4
B	
43.4	0

1094. (249)
B = C_8H_8O
Acetophenone

°C	Wt. % A
A	
102.0	100
A + AB	
+ 1.0U	41
AB + B	
− 2.0E	28
B	
+20.5	0

$C_6H_6O_2$.—(*Continued*)

1094.1. (274.1)
B = $C_9H_8O_2$
Cinnamic acid

°C	Wt. % A
A	
103.5	100
A + B	
81.0E	54
B	
133.0	0

1095. (420)
B = $C_{10}H_7NO_2$
α-Nitro-naphthalene

°C	Wt. % A
A	
103.5	100
101.2	95
99.1	90
95.2	80
91.1	70
86.5	60
81.0	50
73.3	40
63.0	30
A + B	
44.8E	17
B	
49.7	10
52.9	5
55.8	0

v. also 1865, 1866

1096. (245)
B = $C_{10}H_8$
Naphthalene

°C	Wt. % A
A	
104.0	100
101.0	95
98.3	90
93.7	80
89.7	70
86.2	60
84.0	50
82.7	40
80.0	30
A + B	
72.0E	18
B	
75.5	10
77.7	5
80.1	0

1097. (383)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Mol % A
A	
103.2	100
94.0	84.6
83.0	71.3
71.3	60.4
56.3	50.0
A + AB_2	
41.65E	42 0

1097.—(*Continued*)

°C	Mol % A
AB_2	
42.05	39.1
43.4	**33**
40.95	23.7
AB_2 + B	
36.95E	16
B	
38.4	13.9
41.3	10.2
48.0	0

1098. (232)
B = $C_{10}H_9N$
β-Naphthylamine

°C	Wt. % A
A	
103.0	100
A + B	
75.0E	57
AB	
77.4	**43**
AB + B	
76.3E	35
B	
109.0	0

1099. (97, 98, 253)
B = $C_{10}H_{16}O$
Camphor

A	
102.5	100
A + AB_2	
0E	38.7
AB_2 + B	
8U	**27**
B	
175.0	0

1100. (234)
B = $C_{10}H_{16}O$
Fenchone

A	
103.5	100
No solid phase	
−5.0 to −3.0	40.5 to 8.0
B	
5.3	0

1101. (36)
B = $C_{10}H_{18}O$
Cineole

A	
104.0	100
A + AB	
31.0E	44
AB	
+39.0	**41.6**
AB + B	
− 2.0E	5
B	
+ 1.0	0

1102. (238)
B = $C_{11}H_{12}N_2O$
Antipyrine

A	
103.0	100

1102.—(*Continued*)

°C	Wt. % A
A + A_2B	
57.5E	68.5
A_2B	
73.6	**54**
A_2B + AB	
57.0E	42
AB	
58.8	**37**
AB + AB_2	
57.0E	30
AB_2	
65.5	**22.6**
AB_2 + B	
65.2E	22
B	
109.8	0

1103. *v.* p. 178
B = $C_{12}H_9N$
Carbazole

1103.1. (274.2)
B = $C_{12}H_{10}N_2$
Azobenzene

°C	Wt. % A
A	
104.5	100
A + B	
60.0E	12.5
B	
67	0

1104. (261)
B = $C_{12}H_{11}N$
Diphenylamine

°C	Wt. % A
A	
102.8	100
A + B	
48.5E	6.5
B	
52.3	0

1105. (262)
B = $C_{13}H_9N$
Acridine

A	
102.8	100
97.0	90
A + AB	
93.5E	85
AB	
101.0	80
114.0	70
125.0	60
135.0	50
144.5	**38**
143.0	30
134.5	20
122.0	10
AB + B	
102.0E	4
B	
106.5	0

1106. (274)
B = $C_{13}H_{10}O$
Benzophenone

°C	Wt. % A
A	
103.0	100
A + B	
11.3E	29
B	
47.0	0

1107. (235)
B = $C_{13}H_{12}$
Diphenylmethane

A	
101.8	100
A + B	
23.1E	1
B	
23.9	0

1107.1. (234.1)
B = $C_{13}H_{12}O$
Benzhydrol

A	
103.5	100
A + B	
55.0E	18
B	
64.5	0

1108. (254)
B = $C_{19}H_{16}$
Triphenylmethane

A	
102.8	100
A + B	
80.0E	18
B	
91.0	0

1109. (271)
B = $C_{19}H_{16}O$
Triphenyl carbinol

A	
103.0	100
A + A_2B	
76.0E	60.5
A_2B	
82.0	**45.8**
A_2B + B	
66.0E	33.5
B	
159.2	0

v. also 299, 375, 445, 458.6, 459.6, 481, 592, 1860, 1864, 1866

$C_6H_6O_2$
Resorcinol

1110. (195, 420)
B = $C_6H_6O_2$
Hydroquinol

°C	Mol % A
A	
109.5	100.0
100.0	84.2

1110.—(*Continued*)

°C	Mol % A
A	
90.0	73.3
A + B	
86.0E	70.0
B	
90.0	69.2
100.0	66.7
110.0	63.5
120.0	59.3
130.0	54.5
140.0	47.3
150.0	36.3
160.0	19.7
170.5	0.0

v. also 1864

1111. (259)
B = C_6H_7N
Aniline

A	
110.0	100.0
102.0	89.6
89.5	73.8
77.5	64.7
65.0	56.8
50.0	50.3

1112. (247)
B = C_6H_7NO
m-Aminophenol

°C	Wt. % A
A	
108.5	100
A + B	
62.0E	55
B	
118.0	0

1113. (247)
B = C_6H_7NO
p-Aminophenol

A	
108.5	100
A + B	
61.0E	75
B	
120.0	48.8

1114. (264)
B = $C_6H_8N_2$
o-Phenylenediamine

A	
108.5	100
A + AB	
47.0E	60
AB	
50.1	**49.5**
AB + B	
45.0E	36
B	
100.0	0

1115. (264)
B = $C_6H_8N_2$
m-Phenylenediamine

A	
108.5	100

1115.—(*Continued*)

°C	Wt. % A
A + AB	
53.0E	72
AB	
79.0	**49.5**
AB + B	
33.0E	20
B	
62.0	0

1116. (264)
B = $C_6H_8N_2$
p-Phenylenediamine

A	
108.5	100
A + AB	
94.0E	85
AB	
116.0	**49.5**
AB+ B	
102.0	32.5
B	
138.0	0

1117. *v.* p. 178
B = $C_7H_6O_2$
m-Hydroxy-benzaldehyde

1118. (231)
B = C_7H_7NO
Benzamide

A	
108.5	100
A + AB	
76.2E	67.5
AB	
88.2	**47.6**
AB + B	
80.5E	34
B	
124.8	0

1119. (383, 467)
B = C_7H_9N
p-Toluidine

°C	Mol % A
A	
108.7	100.0
97.8	84.6
80.9	69.6
56.5	58.7
A + AB	
30.8E	54.5
AB	
31.95	**50.0**
26.4	40.0
AB + AB_2	
16.4U	33.3
AB_2 + B	
15.0E	27.5
B	
19.2	25.6
32.9	15.1
43.3	0.0

1120. (249)
B = C_8H_8O
Acetophenone

°C	Wt. % A
A	
109.0	100
A + AB	
+13.0U	47
AB + B	
− 5.0E	26
B	
+20.5	0

1121. (68)
B = C_8H_{10}
m-Xylene

1121.1. (274.1)
B = $C_9H_8O_2$
Cinnamic acid

A	
115.0	100
A + B	
87.0E	59.0
B	
133.0	0

1122. (420)
B = $C_{10}H_7NO_2$
α-Nitronaphthalene

A	
109.5	100
107.9	95
106.0	90
102.5	80
98.7	70
94.5	60
89.5	50
83.6	40
76.5	30
65.5	20
A + B	
49.5E	10.1
B	
52.9	5
55.8	0

v. also 1865

1123. (245, 467)
B = $C_{10}H_8$
Naphthalene

A	
110.0	100
105.4	95
102.5	90
99.1	80
97.3	70
97.0	60
97.0	50
96.9	40
96.1	30
94.5	20
88.5	10
A + B	
76.0E	4
B	
80.1	0

1124. (467)
B = $C_{10}H_8O$
β-Naphthol

°C	Mol % A
A	
110	100.0
90	66.67
B	
88	50.0
100	33.33
122	0.00

1125. (383)
B = $C_{10}H_9N$
α-Naphthylamine

A	
108.8	100
A + AB	
65.0E	53.5
AB	
65.05	**50**
AB + B	
38.2E	15
B	
48.1	0

1126. (232, 467)
B = $C_{10}H_9N$
β-Naphthylamine

°C	Wt. % A
A	
109.0	100
A + AB	
78.0E	60.5
AB	
81.2	**43.4**
AB + B	
80.0	35.5
B	
109.0	0

1127. (97, 98, 268)
B = $C_{10}H_{16}O$
Camphor

°C	Mol % A
A	
110.0	100
105.5	95
101.0	90
96.0	85
91.0	80
85.0	75
77.0	70
66.0	65
52.0	60
A + AB	
24.0E	52.2
AB	
29.0	**50**
25.2	45
17.8	40
AB + B	
1.0E	33.3
B	
19.5	30
47.0	25
75.0	20
101.0	15

1127.—(*Continued*)

°C	Mol % A
B	
130.0	10
160.0	5
178.0	0

1128. (234)
B = $C_{10}H_{16}O$
Fenchone

°C	Wt. % A
A	
115.0	100
No solid phase	
49 to −8.3	46.4 to 12
B	
5.3	0

1129. (36)
B = $C_{10}H_{18}O$
Cineole

A	
110.0	100
A + AB	
73.0E	60
AB	
+89.0	**41.6**
AB + B	
− 2.0E	1
B	
+ 1.0	0

1130. (238)
B = $C_{11}H_{12}N_2O$
Antipyrine

A	
109.8	100
No solid phase	
72.0 to 69.0	70.8 to 51.5
AB	
100.5	**36.9**
AB + B	
52.5E	24
B	
110.0	0

1130.1. *v.* p. 178
B = $C_{12}H_9N$
Carbazole

1130.2. (274.2)
B = $C_{12}H_{10}N_2$
Azobenzene

A	
115.0	100
A + B	
57.2E	20.0
B	
67	0

1131. (261)
B = $C_{12}H_{11}N$
Diphenylamine

A	
110.0	100
A + B	
48.5E	6.5
B	
52.2	0

1133. (262)
B = $C_{13}H_9N$
Acridine

°C	Wt. % A
A	
107.8	100
103.0	90
A + AB_2	
96.0E	77.5
AB_2	
115.0	70
136.0	60
179.5	**23.5**
AB_2 + B	
105.0E	5
B	
106.5	0

1134. (274)
B = $C_{13}H_{10}O$
Benzophenone

A	
+109.0	100
A + B	
− 7.0E	29.5
B	
+ 47.0	0

1135. (235)
B = $C_{13}H_{12}$
Diphenylmethane

A		
108.8	100	
102	73 to 16	
A + B		
23.1E	*ca.* 0	
B		
23.9	0	
Two liquid phases		
102Trp.	73	16
110	62	25
112	60	29
115.4 crit.	42	

1135.1. (234.1)
B = $C_{13}H_{12}O$
Benzhydrol

A	
115.0	100
A + B	
44.0E	27
B	
64.5	0

1136. (467)
B = $C_{14}H_{10}$
Anthracene

°C	Mol % B
213	100.0
190	66.67
186	50.00
180	33.30
110	0.00

1137. (254)
B = $C_{19}H_{16}$
Triphenylmethane

°C	Wt. % A
A	
109.0	100

1137.—(*Continued*)

°C	Wt. % A	
A		
106.0	86 to 10	
A + B		
87.0E	6	
B		
91.0	0	
Two liquid phases		
160.0Trp.	86	10
130	77	16
135	72.1	12
140	65	35
142 crit.	45	

1138. (271)
B = $C_{19}H_{16}O$
Triphenyl carbinol

v. also 300, 324, 376, 446, 458.7, 459.7, 482, 593, 854, 1084, 1860, 1864

$C_6H_6O_2$
Hydroquinol

1139. (259)
B = C_6H_7N

°C	Mol % A
A	
169.0	100
A + AB_2	
88.5E	33.3
AB_2	
85.0	21.1
68.5	7.4
54.5	3.1

1140. (247)
B = C_6H_7NO
m-Aminophenol

°C	Wt. % A
A	
168.0	100.0
A + A_xB_y	
107.0U	42.0
A_xB_y + B	
104.5E	22.0
B	
118.0	0.0

1141. (264)
B = $C_6H_8N_2$
o-Phenylenediamine

A	
169.0	100
A + AB_2	
103.0E	39.5
AB_2	
105.0	**33.7**
AB_2 + B	
91.8E	11
B	
99.8	0

1142. (264)
B = $C_6H_8N_2$
m-Phenylenediamine

A	
169.0	100

1142.—(*Continued*)

°C	Wt. % A
A + AB	
120.0E	58
AB	
127.0	**50.4**
AB + B	
60.0E	6
B	
62.0	0

1143. (264)
B = $C_6H_8N_2$
p-Phenylenediamine

A	
169.0	100
A + A_3B	
152.0E	81
A_3B	
155.0	**75.5**
A_3B + AB	
155.0E	72
AB	
193.0	**50.4**
AB + B	
134.0E	7
B	
138.0	0

1144. (258)
B = $C_7H_6O_2$
m-Hydroxy-benzaldehyde

A	
169.0	100
A + B	
88.0E	27
B	
105.0	0

1145. (231)
B = C_7H_7NO
Benzamide

A	
169.0	100
A + AB_2	
100.0E	44
AB_2	
103.9	**31.2**
AB_2 + B	
101.1E	23
B	
124.8	0

1146. (383)
B = C_7H_9N
p-Toluidine

°C	Mol % A
A	
169.2	100
A + AB_2	
96.5E	37
AB_2	
96.75	**33**
AB_2 + B	
42.6E	1.2
B	
43.4	0

$C_6H_6O_2$.—(*Continued*)

1147. (249) $B = C_8H_8O$ Acetophenone

°C	Wt. % A
A	
168.2	100
A + AB	
40.0U	18
AB + B	
18.5E	3.5
B	
20.5	0

1147.1. (274.1) $B = C_9H_8O_2$ Cinnamic acid

A	
170.0	100
A + B	
117.0E	19.0
B	
133.0	0

1148. (420) $B = C_{10}H_7NO_2$ α-Nitronaphthalene

A	
170.5	100
168.7	95
167.0	90
163.6	80
160.2	70
156.6	60
152.9	50
148.6	40
143.5	30
136.0	20
121.0	10
A + B	
54.5E	2.5
B	
55.8	0.0

v. also 1866

1149. (245) $B = C_{10}H_8$ Naphthalene

A	
170.0	100
163.5	95
159.0	90
156.0	80
155.5	70
154.8	60
154.2	50
153.7	40
152.5	30
150.0	20
139.0	10
A + B	
79.0E	1.5
B	
80.1	0

1150. (383) $B = C_{10}H_9N$ α-Naphthylamine

1150.—(*Continued*)

°C	Mol % A
A	
169.2	100
A + AB	
57.5U	13.5
AB + B	
45.3E	6
B	
48.0	0

1151. (232) $B = C_{10}H_9N$ β-Naphthylamine

°C	Wt. % A
A	
168.0	100
A + AB_2	
138.5E	47.5
AB_2	
141.7	**27.8**
AB_2 + B	
107.5E	1.5
B	
109.0	0

1152. (217) $B = C_{10}H_{10}O_3$ *p*-Methoxy-cinnamic acid

°C	Mol % A
A	
169.0	100
157.3	79.8
145.4	59.8
A + B	
140.8E	55
B	
149.7	40
156.2	30
161.7	19.9
167.3	10
170.6	0
Liquid crystals	
170.6	8
174.7–170.5	5.7
179.9–177.6	3.19
185.5	0

1153. (97, 98, 253) $B = C_{10}H_{16}O$ Camphor

A	
169.0	100
167.5	95
164.3	90
160.3	85
156.2	80
150.8	75
145.7	70
139.3	65
132.0	60
123.5	55
111.5	50
97.5	45

1153.—(*Continued*)

°C	Mol % A
A + AB	
62.0U	37.5
AB + B	
49.0E	33.3
B	
63.0	30
84.0	25
103.5	20
122.5	15
141.5	10
161.0	5
178.0	0

1154. (234) $B = C_{10}H_{16}O$ Fenchone

°C	Wt. % A
A	
169.0	100
No solid phase	
34.0 to 0	18.8 to 4.8
B	
5.3	0

1155. (36) $B = C_{10}H_{18}O$ Cineole

A	
170.0	100
A + AB_2	
103.0E	30
AB_2	
+106.5	**26.32**
AB_2 + B	
− 2.0E	1
B	
+ 1.0	0

1156. (238) $B = C_{11}H_{12}N_2O$ Antipyrine

A	
168.0	100
A + A_3B_2	
116.0E	58.5
A_3B_2	
129.0	**46.7**
A_3B_2 + AB_2	
118.0E	34
AB_2	
129.0	**22.6**
AB_2 + B	
101.0E	4.7
B	
109.8	0

1157. (263) $B = C_{12}H_9N$ Carbazole

A	
168.0	100
A + B	
163.0E	85
B	
235.8	0

1157.1. (274.2) $B = C_{12}H_{10}N_2$ Azobenzene

°C	Wt. % A
A	
170.0	100
A + B	
55.0E	1.0
B	
67	0

1158. (261) $B = C_{12}H_{11}N$ Diphenylamine

A	
168.2	100
A + B	
51.0E	1
B	
52.0	0

1159. (262) $B = C_{13}H_9N$ Acridine

A	
169.0	100
164.0	90
A + AB_2	
159.0E	77
AB_2	
166.0	70
178.0	60
189.0	50
199.0	40
206.5	30
209.5	**20**
201.7	10
187.0	5
AB_2 + B	
105.5E	*ca.* 1
B	
106.5	0

1160. (274) $B = C_{13}H_{10}O$ Benzophenone

A	
170.4	100
A + B	
41.3E	11
B	
47.0	0

1161. (235) $B = C_{13}H_{12}$ Diphenylmethane

A	
168.8	100
160–162	70–30
A + B	
23.9E	*ca.* 0
B	
23.9	0

1161.1. (234.1) $B = C_{13}H_{12}O$ Benzhydrol

A	
169.0	100

1161.1.—(*Cont'd*)

°C	Wt. % A
A + B	
58.0E	2.5
B	
64.5	0

1162. (217) $B = C_{14}H_{14}N_2O_3$ *p*-Azoxyanisole

°C	Mol % A
A	
169.0	100
162.0	90
156.0	80
151.0	70
146.0	60
139.5	50
128.0	40
A + B	
106.2E	25.6
B	
108.0	20
111.0	10
114.0	0
Liquid crystals	
113.5–116.3	8
119.0–121.0	6
124.5–125.7	4
130.0–130.3	2
135.0	0

1163. (254) $B = C_{19}H_{16}$ Triphenylmethane

°C	Wt. % A	
A		
168.5	100	
160	80 to 13	
A + B		
91.0E	*ca.* 0	
B		
91.0	0	
Two liquid phases		
160.0Trp.	80	13
173	63.7	27.3
175	59.5	29.9
176	55.1	33.8
177.0crit.	45	

1164. (271) $B = C_{19}H_{16}O$ Triphenyl carbinol

A	
169.0	100
A + A_2B	
145.2E	52.2
A_2B	
151.6	**42.5**
A_2B + B	
139.8E	18.5
B	
159.2	0

v. also 301, 377, 447, 458.8, 459.71, 483, 559, 806, 1085, 1110, 1860, 1864, 1866

$C_6H_6O_3$ Pyrogallol

1165. (273) $B = C_6H_7N$ Aniline

°C	Wt. % A
A	
126.0	100
A + AB_2	
48.4E	48
AB_2	
+49.0	**40.3**
AB_2 + B	
−13.0	12
B	
− 6.7	0

1166. (247) $B = C_6H_7NO$ *m*-Aminophenol

A	
129.0	100
A + B	
77.0E	48
B	
118.0	0

1167. (273) $B = C_6H_8N_2$ *o*-Phenylenediamine

A	
126.0	100
A + AB	
88.0E	69
AB	
93.6	**53.8**
AB + B	
74.2E	30
B	
100.9	0

1168. (273) $B = C_6H_8N_2$ *m*-Phenylenediamine

A	
126.0	100
A + AB	
75.0E	67
AB	
79.0	**53.8**
AB + B	
31.0E	21.5
B	
61.0	0

1169. (273) $B = C_6H_8N_2$ *p*-Phenylenediamine

A	
126.0	100
A + A_2B	
98.0E	78
A_2B	
106.0	**69.9**
A_2B + AB	
104.0E	66.5
AB	
110.0	**53.8**
AB + B	
98.0E	32.5

1169.—(*Continued*)

°C	Wt. % A
B	
139.8	0

1170. *v.* p. 178
B = $C_7H_6O_2$
m-Hydroxybenzaldehyde

1171. (273)
B = C_7H_7NO
Benzamide

°C	Wt. % A
A	
126.1	100
A + AB	
78.0E	63.5
AB	
83.0	**51**
AB + B	
76.0E	37.5
B	
124.8	0

1172. (273)
B = C_7H_9N
p-Toluidine

°C	Wt. % A
A	
125.5	100
A + AB_2	
53.8E	46
AB_2	
57.0	**37**
AB_2 + B	
36.0E	14
B	
44.0	0

1173. (249)
B = C_8H_8O
Acetophenone

°C	Wt. % A
A	
126.0	100
A + AB	
21.0U	39
AB + B	
4.0E	23
B	
20.0	0

1173.1. (274.1)
B = $C_9H_8O_2$
Cinnamic acid

°C	Wt. % A
A	
130.5	100
A + B	
101.0E	44.0
B	
133.0	0

1174. (273)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Wt. % A
A	
126.0	100
A + AB	
41.7U	36
AB + B	
32.2E	14
B	
48.5	0

1175. (273)
B = $C_{10}H_9N$
β-Naphthylamine

°C	Wt. % A
A	
126.0	100
A + AB_2	
108.3E	64
AB_2	
122.5	**30.4**
AB_2 + B	
105.0E	6
B	
109.0	0

1176. (206, 253)
B = $C_{10}H_{16}O$
Camphor

°C	Mol % A
A	
130.8	100
125.8	90
118.8	80
108.5	70
94.0	60
73.0	50
62.0	45
49.0	40
35.0	35
A + B	
21.0E	31
B	
80.0	25
109.0	20
130.0	15
148.0	10
163.0	5
178.0	0

1177. (234)
B = $C_{10}H_{16}O$
Fenchone

°C	Wt. % A
A	
131.0	100
No solid phase	
18.0 to −2.5	31.9 to 11.4
B	
+5.0	0

1178. (238)
B = $C_{11}H_{12}N_2O$
Antipyrine

°C	Wt. % A
A	
126.0	100
No solid phase	
59 to 59.5	63.8 to 21.2
B	
109.8	0

1179. *v.* p. 178
B = $C_{12}H_9N$
Carbazole

1179.1. (274.2)
B = $C_{12}H_{10}N_2$
Azobenzene

1179.1.—(*Continued*)

°C	Wt. % A
A	
132.0	100
A + B	
65.0E	*ca.* 0
B	
67	0

1180. (261)
B = $C_{12}H_{11}N$
Diphenylamine

°C	Wt. % A
A	
126.0	100
A + B	
51.0E	1
B	
52.0	0

1181. (274)
B = $C_{13}H_{10}O$
Benzophenone

°C	Wt. % A
A	
126.0	100
A + B	
32.9E	18.5
B	
47.0	0

1182. (235)
B = $C_{13}H_{12}$
Diphenylmethane

°C	Wt. % A	
A		
126.0	100	
115.2	90 to 8	
A + B		
23.5E	1	
B		
23.9	0	
Two liquid phases		
115.2Trp.	90	8
120	78	20
122	68	31
122.9crit.	50	

1182.1. (234.1)
B = $C_{13}H_{12}O$
Benzhydrol

°C	Wt. % A
A	
131.0	100
A + B	
53.0E	22.0
B	
64.5	0

1183. (254)
B = $C_{19}H_{16}$
Triphenylmethane

°C	Wt. % A	
A		
126.0	100	
125.0	95 to 12	
A + B		
89.0E	2.5	
B		
91.0	0	
Two liquid phases		
125.0Trp.	95	12
140	91	18

1183.—(*Continued*)

°C	Wt. % A	
Two liquid phases		
150	78	29
160	69	36
178.5crit.	52	

1184. (243)
B = $C_{19}H_{16}O$
Triphenyl carbinol

°C	Wt. % A
A	
132.0	100
A + A_3B_2	
76.0E	51
A_3B_2	
97.0	**42**
A_3B_2 + B	
65.0E	30
B	
159.0	0

v. also 302, 378, 448, 458.81, 459.8, 484, 1860

C_6H_7N
Aniline

1185. (242)
B = C_6H_7NO
m-Aminophenol

°C	Mol % A
A	
− 6.0	100
− 10.2	95
A + B	
− 16.5E	87.5
B	
+ 18.8	80
44.5	70
61.6	60
75.8	50
87.6	40
97.7	30
106.8	20
113.5	10
119.2	5
123.0	0

1186. (408)
B = C_6H_7NO
p-Aminophenol

°C	Wt. % A
−6.00	100
−6.58	99
−7.16	98
−7.74	97

1187. (408)
B = C_6H_7NO
Phenylhydroxylamine

°C	Wt. % A
−6.00	100
−6.47	99
−6.94	98
−7.41	97

1188. (408)
B = $C_6H_8N_2$
m-Phenylenediamine

1188.—(*Continued*)

°C	Wt. % A
−6.00	100
−6.60	99
−7.18	98
−7.75	97

1189. (222)
B = $C_7H_5N_3O_6$
Trinitrotoluene

°C	Mol % A
A	
− 5.5	100
A + AB	
− 8.0E	98.5
AB	
+ 35.0	88.7
71.0	76.6
77.0	59.5
85.0	**50.0**
84.0	41.2
78.0	29.8
AB + B	
60E	15
B	
74.5	8.1
82.0	0

1190. (8, 12)
B = $C_7H_6O_2$
Benzoic acid

°C	Mol % A
A	
− 6.0	100
A + AB	
− 9.0E	96
AB	
+ 8.5	90
31.8	80
48.0	70
AB + B	
56.0U	60
B	
72.3	50
86.0	40
97.5	30
107.0	20
114.7	10
121.25	0

1191. (222)
B = $C_7H_6N_2O_4$
2, 4-Dinitrotoluene

°C	Mol % A
A	
− 5.5	100
− 11.5	91.6
A + B	
− 13.0E	89
B	
0.0	79.1
+ 20.0	64.7
31.0	55.4
41.0	44.8
49.0	35.8
56.0	26.0
65.0	11.0
71.0	0.0

1192. (259)
B = $C_7H_6N_2O_4$
2, 6-Dinitrotoluene

1192.—(*Continued*)

°C	Mol % A
A	
− 5.5	100.0
−10.5	92.7
A + B	
−13.0E	88.8
B	
+ 0.5	78.9
14.0	68.0
25.0	55.4
35.5	40.6
41.8	29.3
62.0	0.0

1193. (244)
B = $C_7H_6N_2O_4$
3, 4-Dinitrotoluene

°C	Wt. % A
A	
− 5.8	100
A + B	
−17.0E	69
B	
+58.5	0

1194. (244, 259)
B = $C_7H_6N_2O_4$
3, 5-Dinitrotoluene

°C	Wt. % A
A	
− 6.0	100
A + AB	
−12.9E	92.5
AB	
+46.5	**33.8**
AB + B	
46.0E	32
B	
82.3	0

1195. *v.* p. 178
B = $C_7H_7NO_2$
p-Nitrotoluene

1196. (223)
B = C_7H_8O
o-Cresol

°C	Mol % A
A	
− 6.3	100
− 9.3	95
−12.5	90
A + AB	
−18.0E	82.2
AB	
− 1.2	70
+ 6.6	60
8.0	55
8.4	**50**
8.2	45
7.2	40
AB + B	
4.0E	31
B	
14.3	20
22.8	10
26.8	5
30.4	0

C_6H_7N.—(*Continued*)

1197. (223)
B = C_7H_8O
m-Cresol

°C	Mol % A
A	
− 6.3	100
− 9.3	95
−13.5	90
A + AB	
−29.5E	76.7
AB	
−22.8	70
−16.1	60
−14.7	55
−14.5	**50**
−15.2	45
−18.3	40
AB + B	
−29.5E	31
B	
−15.4	20
− 4.5	10
+ 0.2	5
4.2	0

1198. (223)
B = C_7H_8O
p-Cresol

°C	Mol % A
A	
− 6.3	100
− 9.7	95
A + AB	
−15.0E	89
AB	
+ 0.5	80
12.0	70
17.9	60
18.9	55
19.2	**50**
18.7	45
17.0	40
AB + B	
5.8E	25.7
B	
12.8	20
23.8	10
28.7	5
33.2	0

1199. (408)
B = C_7H_9N
o-Toluidine

°C	Wt. % A
− 6.00	100
− 6.60	99
− 7.18	98
− 7.75	97
− 8.33	96
− 8.95	95
− 9.53	94
−10.11	93

1201. *v.* p. 178
B = C_7H_9N
p-Toluidine

1202. (219)
B = $C_8H_{10}N_2O$
Nitrosodimethylaniline

°C	Mol % A
A	
− 5.5	100
A + AB_2	
− 8.5E	97
AB_2	
+ 24.0	90
50.0	80
69.5	70
80.0	60
87.0	50
89.6	45
91.4	40
92.4	**33.3**
92.0	30
90.5	25
87.8	20
82.2	15
AB_2 + B	
74.5E	11
B	
82.5	5
85.5	0

1203. (408)
B = $C_8H_{11}N$
Xylidene

°C	Wt. % A
−6.00	100
−7.00	99
−7.75	98
−8.48	97
−9.00	96

1204. (247)
B = $C_{10}H_8O$
α-Naphthol

A	
− 6.0	100
A + A_2B	
−14.0E	89
A_2B	
+28.0	**56.3**
A_2B + AB	
26.5E	50.5
AB	
32.0	**39.2**
AB + B	
31.5E	36.5
B	
90.5	0

1205. (247)
B = $C_{10}H_8O$
β-Naphthol

A	
− 6.0	100
A + AB	
− 7.0E	96
AB	
+82.2	**39.2**
AB + B	
80.5E	30

1205.—(*Continued*)

°C	Wt. % A
B	
121.8	0

1205.1. (475)
B = $C_{10}H_9N$
β-Naphthylamine

°C	Mol % A
0.0?	97.5
2.0?	95
8.0	90
45.0	80
60.0	70
70.0	60
78.0	50
85.5	40
92.5	30
99.5	20
105.0	10
108.0	5
110.6	0

1206. (475)
B = $C_{12}H_9N$
Carbazole

°C	g B per 100 g A
30.0	3.0
40.0	3.7
50.0	4.8
60.0	6.0
70.0	7.7
80.0	9.8
100.0	16.0
120.0	28.0
140.0	46.0
160.0	74.0

1207. *v.* p. 178
B = $C_{12}H_{10}$
Acenaphthene

1208. *v.* p. 178
B = $C_{13}H_{10}$
Fluorene

1209. *v.* p. 178
B = $C_{14}H_8O_2$
Anthraquinone

1210. (475)
B = $C_{14}H_{10}$
Anthracene

°C	g B per 100 g A
20.0	0.7
30.0	1.0
40.0	1.45
50.0	2.05
60.0	2.82
70.0	3.9
80.0	5.45
90.0	7.75
100.0	10.7

1211. *v.* p. 178
B = $C_{14}H_{10}$
Phenanthrene

1212. (147, 254)
B = $C_{19}H_{16}$
Triphenylmethane

°C	Mol % A
B	
91.0	100
AB + B	
70.0E	61
AB	
71.5	**50**

v. also 45, 276, 436.1, 438.1, 455, 467, 560, 680, 689, 694, 698, 710, 733, 756, 774, 836, 846, 855, 872, 901, 925, 963, 1041, 1086, 1111, 1139, 1165; *v. also* Seidell, p. 433

C_6H_7NO
o-Aminophenol

1214. (36)
B = $C_{10}H_{18}O$
Cineole

°C	Wt. % A
A	
170.0	100
A + B	
0.0	2.5
B	
1.0	0

v. also 964

C_6H_7NO
m-Aminophenol

1215. (242)
B = $C_6H_8N_2$
o-Phenylenediamine

A	
118.0	100
A + B	
63.0E	45
B	
100.5	0

1216. (242)
B = $C_6H_8N_2$
m-Phenylenediamine

A	
118.0	100
A + B	
24.0E	37
B	
62.0	0

1217. (242)
B = $C_6H_8N_2$
p-Phenylenediamine

A	
118.0	100
A + A_2B	
94.0E	77
A_2B	
97.0	**66.6**
A_2B + AB	
95.0E	62

1217.—(*Continued*)

°C	Wt. % A
AB	
102.5	**50.2**
AB + B	
101.0	44
B	
138.5	0

1218. (247)
B = $C_7H_6N_2O_4$
2, 4-Dinitrotoluene

A	
118.0	100
A + B	
65.0E	10
B	
71.0	0

1219. (242)
B = C_7H_9N
p-Toluidine

A	
118.0	100
A + AB	
50.0U	35
AB + B	
37.0E	13
B	
44.0	0

1220. (247)
B = $C_{10}H_8O$
α-Naphthol

A	
118.0	100
A + B	
69.0E	30
B	
92.0	0

1221. (247)
B = $C_{10}H_8O$
β-Naphthol

A	
118.0	100
A + AB	
97.5E	58.5
AB	
99.0	**43.5**
AB + B	
96.0E	26
B	
121.5	0

1222. (242)
B = $C_{10}H_9N$
α-Naphthylamine

A	
118.0	100
A + B	
36.0E	16
B	
48.0	0

1223. (242)
B = $C_{10}H_9N$
β-Naphthylamine

A	
118.0	100

1223.—(*Continued*)

°C	Wt. % A
A + AB	
90.5E	49
AB	
91.0	**43.3**
AB + B	
90.0E	29
B	
108.8	0

1224. (36)
B = $C_{10}H_{18}O$
Cineole

A	
123.0	100
A + B	
−3.0E	4
B	
+ 1.0	0

v. also 711, 734, 873, 902, 926, 965, 1042, 1087, 1112, 1140, 1166, 1185

C_6H_7NO
p-Aminophenol

1225. (242)
B = C_7H_9N
p-Toluidine

°C	Wt. % B
B	
43.5	100
A + B	
41.0E	95
A	
149.0	45.5

1226. (247)
B = $C_{10}H_8O$
α-Naphthol

B	
92.5	100
A + B	
82.0E	86
A	
147.0	62.1

1227. (247)
B = $C_{10}H_8O$
β-Naphthol

B	
121.5	100
A + B	
106E	83
A	
160	43

v. also 966, 1043, 1113, 1186

C_6H_7NO
Phenylhydroxylamine
v. 1187

$C_6H_8N_2$

o-Phenylenediamine

1228. (250)
B = $C_7H_5N_3O_6$
Trinitrotoluene

°C	Wt. % A
A	
101.0	100
A + AB	
83.0E	57
AB	
97.5	**32.2**
AB + B	
65.0E	9
B	
81.0	0

1229. (264)
B = $C_7H_6N_2O_4$
2, 4-Dinitrotoluene

A	
99.8	100
A + B	
51.9E	21.5
B	
69.0	0

1230. (269)
B = $C_8H_{10}N_2O$
Nitrosodimethyl-aniline

A	
100.2	100
A + AB	
87.0E	71
AB	
99.0	**41.8**
AB + B	
67.7E	12.5
B	
84.5	0

1231. (264)
B = $C_{10}H_8O$
α-Naphthol

A	
99.8	100
A + AB	
58.2E	56
AB	
60.0	**42.8**
AB + B	
58.0E	26
B	
92.0	0

1232. (264)
B = $C_{10}H_8O$
β-Naphthol

A	
99.8	100
A + AB	
79.0E	65
AB	
86.0	**42.8**
AB + B	
80.5E	28
B	
122.0	0

1233. (240)
B = $C_{10}H_8O_2$
1, 4-Dihydroxy-naphthalene

1235. (240)
B = $C_{10}H_8O_2$
1, 6-Dihydroxy-naphthalene

°C	Wt. % A
A	
103.0	100
A + AB	
62.0E	61
AB	
95.0	**40.3**
AB + B	
76.0E	32
B	
134.0	0

1236. (240)
B = $C_{10}H_8O_2$
1, 8-Dihydroxy-naphthalene

A	
103.0	100
A + AB	
93.0E	85
AB	
151.0	**40.3**
AB + B	
117.0E	7
B	
137.0	0

1237. (240)
B = $C_{10}H_8O_2$
2, 3-Dihydroxy-naphthalene

1238. (240)
B = $C_{10}H_8O_2$
2, 6-Dihydroxy-naphthalene

A	
103.0	100
A + A_3B_2	
99.0E	92
A_3B_2	
150	**50.3**
A_3B_2 + B	
124.0E	30
B	
216.0	0

1239. (240)
B = $C_{10}H_8O_2$
2, 7-Dihydroxy-naphthalene

A	
103.0	100
A + A_3B_2	
96.0E	91
A_3B_2	
140.0	**50.3**
A_3B_2 + B	
101.0E	38
B	
186.0	0

1239.1. (234.1)
B = $C_{13}H_{12}O$
Benzhydrol

°C	Wt. % A
A	
102.5	100
A + B	
47.0E	21.0
B	
64.5	0

1240. (251)
B = $C_{19}H_{16}$
Triphenylmethane

A	
101.0	100
A + B	
76.5E	12.5
Immiscible liquids	
89.0	50–29
B	
91.0	0

v. also 485, 561, 712, 735, 757, 775, 874, 903, 927, 958.1, 966.1, 1045, 1088, 1114, 1141, 1167, 1215

$C_6H_8N_2$

m-Phenylenediamine

1241. (250)
B = $C_7H_5N_3O_6$
Trinitrotoluene

A	
62.0	100
A + AB	
57.5E	90.5
AB	
105.0	**32.2**
AB + B	
70.0E	6
B	
81.0	0

1242. (264)
B = $C_7H_6N_2O_4$
2, 4-Dinitrotoluene

A	
62.0	100
A + B	
35.0E	55
B	
69.2	0

1243. (269)
B = $C_8H_{10}N_2O$
Nitrosodimethyl-aniline

A	
61.0	100
A + AB_2	
48.0E	84
AB_2	
96.5	**26.5**
AB_2 + B	
73.5E	11
B	
84.5	0

1244. (264)
B = $C_{10}H_8O$
α-Naphthol

°C	Wt. % A
A	
62.0	100
A + AB	
31.0E	69
AB	
35.0	**42.8**
AB + B	
32.0E	31
B	
92.0	0

1245. (264)
B = $C_{10}H_8O$
β-Naphthol

A	
62.0	100
A + AB_2	
59.0E	97
AB_2	
114.0	**27.3**
AB_2 + B	
103.0E	11
B	
122.0	0

1246. (240)
B = $C_{10}H_8O_2$
1, 4-Dihydroxy-naphthalene

A	
63.5	100
A + AB	
55.0E	92.5
AB	
124.0	**40.3**
AB + B	
?	?
B	
183.0	0

1247. (240)
B = $C_{10}H_8O_2$
1, 6-Dihydroxy-naphthalene

A	
63.0	100
A + AB	
49.0E	89
AB	
125.0	**40.3**
AB + B	
87.0E	22
B	
134.0	0

1248. (240)
B = $C_{10}H_8O_2$
1, 8-Dihydroxy-naphthalene

A	
63.0	100
A + AB	
58.0E	92
AB	
101.0	**40.3**

1248.—(*Continued*)

°C	Wt. % A
AB + B	
75.0E	32
B	
137.0	0

1249. (240)
B = $C_{10}H_8O_2$
2, 3-Dihydroxy-naphthalene

A	
63.0	100
A + AB	
53.0E	94
AB	
149.0	**40.3**
AB + B	
122.0E	24
B	
162.0	0

1250. (240)
B = $C_{10}H_8O_2$
2, 6-Dihydroxy-naphthalene

A	
63.0	100
A + AB	
61.0E	98
AB	
171.0	**40.3**
AB + B	
125.0E	35
B	
216.0	0

1251. (240)
B = $C_{10}H_8O_2$
2, 7-Dihydroxy-naphthalene

A	
63.0	100
A + AB	
53.0E	98
AB	
139.0	**40.3**
AB + B	
126.0E	33
B	
186.0	0

1252. (251, 254)
B = $C_{19}H_{16}$
Triphenylmethane

A	
62.0	100
A + B	
57.0E	96
Immiscible liquids	
80	74–7
B	
90.8	0

There is some evidence for an equimolecular compound

1253. (243)
B = $C_{19}H_{16}O$
Triphenyl carbinol

1253.—(*Continued*)

°C	Wt. % A
A	
62.0	100
A + B	
59.5E	90
B	
159.5	0

v. also 486, 562, 713, 736, 758, 776, 875, 904, 928, 958.2, 966.2, 1046, 1089, 1115, 1142, 1168, 1188, 1216

$C_6H_8N_2$

p-Phenylenediamine

1254. (250)
B = $C_7H_5N_3O_6$
Trinitrotoluene

A	
140.0	100
A + AB	
88.0E	38
AB	
93.0	**32.2**
AB + B	
64.0E	8
B	
81.0	0

1255. (264)
B = $C_7H_6N_2O_4$
2, 4-Dinitrotoluene

A	
138.0	100
A + B	
49.0E	28
B	
69.0	0

1256. (269)
B = $C_8H_{10}N_2O$
Nitrosodimethyl-aniline

A	
139.1	100
A + AB_2	
75.5E	39
AB_2	
93.0	**26.5**
AB_2 + B	
65.0E	10
B	
84.5	0

1257. (264)
B = $C_{10}H_8O$
α-Naphthol

A	
138.0	100
A + AB_2	
95.0E	50
AB_2	
110	**27.3**
AB_2 + B	
84.0E	7
B	
92.0	0

$C_6H_8N_2$.—(*Continued*)

1258. ([264])
B = $C_{10}H_8O$
β-Naphthol

°C	Wt. % A
A	
138.0	100
A + AB₂	
117.0E	74
AB₂	
150.5	**27.3**
AB₂ + B	
120.0E	2
B	
122.0	0

1259. ([240])
B = $C_{10}H_8O_2$
1, 6-Dihydroxy-naphthalene

°C	Wt. % A
A	
147.0	100
A + AB	
125.0E	95
AB	
170.0	**40.3**
AB + B	
121.0E	15
B	
134.0	0

1260. ([240])
B = $C_{10}H_8O_2$
1, 8-Dihydroxy-naphthalene

°C	Wt. % A
A	
147.0	100
A + AB₂	
106.0E	37
AB₂	
118.0	**25.2**
AB₂ + B	
109.0E	21
B	
137.0	0

1261. ([240])
B = $C_{10}H_8O_2$
2, 3-Dihydroxy-naphthalene

°C	Wt. % A
A	
147.0	100
A + AB₂	
118.0E	70
AB₂	
164.0	**25.2**
AB₂ + B	
141.0E	4
B	
162.0	0

1262. ([240])
B = $C_{10}H_8O_2$
2, 6-Dihydroxy-naphthalene

°C	Wt. % A
A	
147 0	100

1262.—(*Continued*)

°C	Wt. % A
A + AB	
140.0E	95
AB	
212.0	**40.3**
AB + B	
195.0E	10
B	
216.0	0

1263. ([240])
B = $C_{10}H_8O_2$
2, 7-Dihydroxy-naphthalene

°C	Wt. % A
A	
147.0	100
A + AB₂	
129.0E	81
AB₂	
180.0	**25.2**
AB₂ + B	
171.0E	10.5
B	
186.0	0

1264. ([235])
B = $C_{13}H_{12}$
Diphenylmethane

°C	Wt. % A
A	
138.8	100
A + B	
23.3E	1
B	
23.9	0

1264.1. ([234.1])
B = $C_{13}H_{12}O$
Benzhydrol

°C	Wt. % A
A	
147.0	100
A + B	
51.0E	11.0
B	
64.5	0

1265. ([254])
B = $C_{19}H_{16}$
Triphenylmethane

°C	Wt. % A
A	
138.8	100
A + B	
87.5E	3
B	
91.0	0

1266. ([243])
B = $C_{19}H_{16}O$
Triphenyl carbinol

°C	Wt. % A
A	
140.0	100
A + B	
118.0E	33
B	
159.5	0

v. also 563, 737, 759, 777, 876, 905, 929, 966.3, 1047, 1090, 1116, 1143, 1169, 1217

$C_6H_8N_2$
Phenylhydrazine
v. 1044

$C_6H_9NO_2$
Ethyl succinimide

1267. ([375])
B = C_7H_7Br
p-Bromotoluene

°C	Wt. % A
A	
28.81	100.00
25.60	95.00
19.57	85.87
7.99	68.94
2.82	61.30
A + B	
0.5E	58
B	
4.55	48.60
10.24	37.84
14.21	28.09
17.89	18.74
21.55	9.80
26.73	0.0

1268. ([375])
B = C_8H_{10}
p-Xylene

°C	Wt. % A
A	
28.81	100.0
18.32	88.84
10.93	79.95
+2.94	70.51
A + B	
−2.6E	63.75
B	
−2.12	59.02
−0.04	51.75
+3.04	41.7
4.85	34.0
6.64	25.63
8.29	18.15
11.18	6.86
13.28	0

$C_6H_{10}O$
Cyclohexanone
v. 1048

$C_6H_{10}O_4$
Diethyl oxalate
v. 130

$C_6H_{10}O_4$
Dimethyl succinate
v. 129, 194, 277

$C_6H_{10}O_4$
Glycol diacetate

1268.1. ([444.1])
B = $C_7H_5N_3O_6$
Trinitrotoluene

°C	g B per 100 g A
25.0	44.43

1268.2. ([444.1])
B = $C_7H_5N_5O_8$
Tetryl

°C	g B per 100 cc A
20–25	16.0

1268.3. ([444.1])
B = $C_8H_7N_3O_6$
2, 4, 6-Trinitro-*m*-xylene

°C	g B per 100 g A
25.0	0.81

1268.4. ([444.1])
B = $C_{10}H_5N_3O_6$
Trinitro-naphthalene

25.0	0.90

v. also 593.1, 635.1, 655.1

C_6H_{12}
Cyclohexane
v. 247, 290.3, 524, 967

$C_6H_{12}Cl_2$
Dichlorohexane
v. 463

$C_6H_{12}Cl_2S$
Dichlorodipropyl sulfide
v. 464

$C_6H_{12}O_3$
Paraldehyde

1269. *v.* p. 178
B = C_8H_{10}
Xylene

v. also 248, 262, 968

$C_6H_{13}N$
d-Pipecoline

1270. ([290])
B = $C_6H_{13}N$
l-Pipecoline

°C	Mol % A
A	
8.95	100
7.0	95
5.0	90
+0.85	80
−3.8	70
A + AB	
−6.65E	64.5
AB	
−5.8	60
−4.9	**50**
−5.8	40
AB + B	
−6.65	35.5
B	
−3.8	30
+0.85	20
5.0	10
7.0	5
8.95	0

C_6H_{14}
Hexane

1271. *v.* p. 178
B = $C_{10}H_8$
Naphthalene

$C_6H_{15}PS$
Triethylphosphine sulfide

1272. ([371])
B = $C_{18}H_{15}PS$
Triphenylphosphine sulfide

°C | Wt. % A
Mixed crystals

t_L	t_S	Wt. % A
95		100
87	82.5	92.57
93	82.5	76.00
82.5E		60
108	82.5	44.66
119	109	34.10
129.5	124	25.00
141	137	14.92
149	147.5	7.32
158		0

$C_7H_4Cl_2O_2$
2, 3-Dichloro-benzoic acid

1277. ([188])
B = $C_7H_4Cl_2O_2$
2, 5-Dichloro-benzoic acid

°C	Mol % A
A	
168.3	100
A + AB₂	
127.0E	46.0
AB₂	
130.2	**33.3**
AB₂ + B	
130.2U	33.3
B	
154.4	0.0

$C_7H_4Cl_2O_2$
2, 5-Dichloro-benzoic acid

1278. ([188])
B = $C_7H_5ClO_2$
m-Chlorobenzoic acid

°C	Mol % A
A	
154.4	100
A + AB	
121.3E	51
AB	
122.3	**50**
AB + B	
119.6E	40
B	
155.0	0

v. also 1277

$C_7H_4Cl_2O_3S$
sym-Chloride of *o*-sulfobenzoic acid

1279. ([308])
B = $C_7H_4Cl_2O_3S$
asym-Chloride of *o*-sulfobenzoic acid

°C	Mol % A
A	
75.9	100
A + B	
21.4E	33.5
B	
37.8	0

$C_7H_4Cl_2O_3S$
sym-Chloride of *m*-sulfobenzoic acid

1280. *v.* p. 178
B = $C_7H_4Cl_2O_3S$
sym-Chloride of *p*-sulfobenzoic acid

v. also 704, 705, 1858, 1859

$C_7H_4Cl_3NO_2$
o-Nitrophenyl-chloroform
v. 1867

$C_7H_4Cl_3NO_2$
m-Nitrophenyl-chloroform

1281. ([173])
B = $C_7H_4Cl_3NO_2$
p-Nitrophenyl-chloroform

°C	% A
A	
140.8	100
132.1	90
A + B	
129.7E	87.3
B	
148.0	80
168.0	70
183.4	60
196.0	50
206.7	40
216.4	30
224.7	20
232.4	10
240.0	0

v. also 1867

$C_7H_5Br_3$
2, 3, 4-Tribromo-toluene

1282. ([193])
B = $C_7H_5Br_3$
2, 3, 5-Tribromo-toluene

°C	Mol % A
A	
45	100
A + B	
14.0E	53.3
B	
52.5	0

1282.1. (193)
B = $C_7H_5Br_3$
2, 3, 6-Tribromotoluene

°C	Mol % A
A	
45	100
A + B	
31.5E	53
B	
60.5	0

1282.15. (193)
B = $C_7H_5Br_3$
2, 4, 5-Tribromotoluene

A	
45.0	100
A + B	
31.5E	73
B	
113.5	0

1282.2. (193)
B = $C_7H_5Br_3$
2, 4, 6-Tribromotoluene

A	
45.0	100
A + B	
23.3E	66
B	
68.5	0

1282.25. (193)
B = $C_7H_5Br_3$
3, 4, 5-Tribromotoluene

A	
45.0	100
A + B	
28.5E	72
B	
90.5	0

$C_7H_5Br_3$
2, 3, 5-Tribromotoluene

1282.3. (193)
B = $C_7H_5Br_3$
2, 3, 6-Tribromotoluene

A	
52.5	100
A + B	
24.5E	56
B	
60.5	0

1282.35. (193)
B = $C_7H_5Br_3$
2, 4, 5-Tribromotoluene

A	
52.5	100
A + B	
40.0E	76.5
B	
113.5	0

1282.4. (193)
B = $C_7H_5Br_3$
2, 4, 6-Tribromotoluene

°C	Mol % A
A	
52.5	100
A + B	
71.2?E	34
B	
68.5	0

1282.45. (193)
B = $C_7H_5Br_3$
3, 4, 5-Tribromotoluene

A	
52.5	100
A + B	
41.5E	80
B	
90.5	0

v. also 1282

$C_7H_5Br_3$
2, 3, 6-Tribromotoluene

1282.5. (193)
B = $C_7H_5Br_3$
2, 4, 5-Tribromotoluene

A	
60.5	100
A + B	
44.5E	74
B	
113.5	0

1282.55. (193)
B = $C_7H_5Br_3$
2, 4, 6-Tribromotoluene

A	
60.5	100
A + B	
33.0E	55
B	
68.5	0

1282.6. (193)
B = $C_7H_5Br_3$
3, 4, 5-Tribromotoluene

A	
60.5	100
A + B	
38.7E	63
B	
90.5	0

v. also 1282.1, 1282.3

$C_7H_5Br_3$
2, 4, 5-Tribromotoluene

1282.65. (193)
B = $C_7H_5Br_3$

1282.65.—(*Cont'd*)
2, 4, 6-Tribromotoluene

°C	Mol % A
A	
113.5	100
A + B	
51.5E	31
B	
68.5	0

1282.7. (193)
B = $C_7H_5Br_3$
3, 4, 5-Tribromotoluene

A	
113.5	100
A + B	
62.5E	40
B	
90.5	0

v. also 1282.15, 1282.35, 1282.5

$C_7H_5Br_3$
2, 4, 6-Tribromotoluene

1282.75. (193)
B = $C_7H_5Br_3$
3, 4, 5-Tribromotoluene

A	
68.5	100
A + B	
61.0E	77
B	
90.5	0

v. also 1282.2, 1282.4, 1282.55, 1282.65

$C_7H_5Br_3$
3, 4, 5-Tribromotoluene
v. 1282.25, 1282.45, 1282.6, 1282.7, 1282.75

C_7H_5ClO
Benzoyl chloride

1283. *v.* p. 178
B = C_8H_{10}
p-Xylene

1284. *v.* p. 178
B = C_9H_{12}
Mesitylene

1285. *v.* p. 178
B = $C_{12}H_{10}$
Diphenyl

1286. *v.* p. 178
B = $C_{13}H_{12}$
Diphenylmethane

v. also 825, 857, 969

$C_7H_5ClO_2$
o-Chlorobenzoic acid

1287. *v.* p. 178
B = $C_7H_5ClO_2$
m-Chlorobenzoic acid
v. also 1868, 1869

1288. *v.* p. 178
B = $C_7H_5ClO_2$
p-Chlorobenzoic acid
v. also 1868

1289. *v.* p. 178
B = $C_7H_6O_2$
Benzoic acid
v. also 1869

1290. (426)
B = C_7H_{16}
Heptane

°C	Wt. % A
140.3	100
137.5	95
135.0	90
132.0	80
130.0	70
128.7	60
128.0	50
126.5	40
124.3	30
119.0	20
109.5	10
96.5	5

v. also 970, 1868, 1869

$C_7H_5ClO_2$
m-Chlorobenzoic acid

1291. *v.* p. 178
B = $C_7H_5ClO_2$
p-Chlorobenzoic acid
v. also 1868

1292. *v.* p. 178
B = $C_7H_6O_2$
Benzoic acid
v. also 1869

1293. (426)
B = C_7H_{16}
Heptane

°C	Wt. % A
154.5	100
150.5	95
147.0	90
143.0	80
140.0	70
137.0	60
134.0	50
131.5	40
127.5	30
120.0	20
106.0	10
91.5	5

v. also 971, 1278, 1287, 1868, 1869

$C_7H_5ClO_2$
p-Chlorobenzoic acid

1294. *v.* p. 178
B = $C_7H_6O_2$
Benzoic acid

1295. (426)
B = C_7H_{16}
Heptane

°C	Wt. % A
241.5	100
238.0	95
235.0	90
229.0	80
224.5	70
221.5	60
218.0	50
213.0	40
206.0	30
196.0	20
180.5	10
160.4	5

v. also 972, 1288, 1291, 1868

$C_7H_5Cl_2NO_2$
o-Nitrobenzylidene chloride

1296.
B = $C_7H_5Cl_2NO_2$
m-Nitrobenzylidene chloride
v. 1870

1297.
B = $C_7H_5Cl_2NO_2$
p-Nitrobenzylidene chloride
v. 1870

$C_7H_5Cl_2NO_2$
m-Nitrobenzylidene chloride

1298.
B = $C_7H_5Cl_2NO_2$
p-Nitrobenzylidene chloride
v. 1296, 1870

$C_7H_5Cl_2NO_4S$
2-Chloro-5-nitro-*p*-toluenesulfone chloride

1299. (89)
B = $C_7H_5Cl_2NO_4S$
2-Chloro-6-nitro-*p*-toluenesulfone chloride

°C	% A
A	
99.2	100
A + B	
50.9E	36.7
B	
70	0

$C_7H_5FO_2$
p-Fluorobenzoic acid

1300. (218)
B = $C_7H_6O_2$
Benzoic acid

°C	Mol % A
Mix.	
182.6	100
176.8	90
170.4	80
163.0	70
160.0U	66.5
157.6	60
152.4	50
146.4	40
139.9	30
132.7	20
125.3	10
121.4	0

C_7H_5N
Cyanobenzene
v. 826

$C_7H_5NO_3$
o-Nitrobenzaldehyde
v. 131, 973

$C_7H_5NO_3$
m-Nitrobenzaldehyde
v. 132, 974, 1049

$C_7H_5NO_3$
p-Nitrobenz aldehyde

1301. (114)
B = $C_{12}H_{10}$
Acenapthene

°C	Wt. % A
A	
103.2	100
A + B	
66.8E	42
B	
92.5	0

v. also 133, 975

$C_7H_5NO_4$
o-Nitrobenzoic acid

1302.
B = $C_7H_5NO_4$
m-Nitrobenzoic acid
v. 1871

1303.
B = $C_7H_5NO_4$
p-Nitrobenzoic acid
v. 1871

$C_7H_5NO_4$.—(*Continued*)

1304. (208)
B = $C_7H_8O_2$
Dimethylpyrone

°C	Mol % A
A	
147.0	100
A + AB	
65.0E	60
AB	
72.3	**50**
AB + B	
68.0E	42
B	
132.1	0

v. also 46, 88, 325, 406, 976, 1871

$C_7H_5NO_4$
m-Nitrobenzoic acid

1305.
B = $C_7H_5NO_4$
p-Nitrobenzoic acid
v. 1871

1306. (7)
B = $C_7H_6O_2$
Benzoic acid

°C	Mol % A
A	
141.5	100
A + AB	
120.0E	80
AB	
139.0	**50**
AB + B	
109.0E	12
B	
120.0	0

v. also 47, 89, 326, 407, 977, 1302, 1871

$C_7H_5NO_4$
p-Nitrobenzoic acid
v. 48, 90, 327, 408, 978, 1303, 1305, 1871

$C_7H_5N_3O_6$
2, 4, 5-Trinitrotoluene

1307. *v.* p. 178
B = $C_7H_5N_3O_6$
2, 4, 6-Trinitrotoluene

$C_7H_5N_3O_6$
2, 4, 6-Trinitrotoluene

1308. (131, 445)
B = $C_7H_5N_5O_8$
Trinitrophenylmethylnitroamine (Tetryl)

1308.—(*Continued*)

°C	Mol % A
A	
80.5	100
78.2	95
75.9	90
70.9	80
A + A_2B	
67.4E	73
A_2B	
67.6	**66.7**
A_2B + B	
67.4E	60
B	
85.0	50
97.0	40
106.8	30
115.2	20
122.5	10
125.8	5
128.72	0

1309. *v.* p. 178
B = $C_7H_6N_2O_4$
2, 4-Dinitrotoluene
v. also 1872

1310. *v.* p. 178
B = $C_7H_6N_2O_4$
2, 6-Dinitrotoluene

1311. (258)
B = $C_7H_6O_2$
m-Hydroxybenzaldehyde

°C	Wt. % A
A	
81.0	100
A + B	
65.5E	81
B	
105.0	0

1312. *v.* p. 178
B = $C_7H_7NO_2$
o-Nitrotoluene
v. also 1873

1313. *v.* p. 178
B = $C_7H_7NO_2$
p-Nitrotoluene
v. also 1872, 1873

1314. (208)
B = $C_7H_8O_2$
Dimethylpyrone

°C	Mol % A
A	
80.7	100
78.3	95
75.6	90
72.7	85
69.8	80
66.8	75
A + B	
63.0E	69.5
B	
69.3	65
75.9	60
82.5	55
88.9	50
94.8	45

1314.—(*Continued*)

°C	Mol % A
B	
100.4	40
105.7	35
110.6	30
115.3	25
119.5	20
123.3	15
126.7	10
132.1	0

1315. (135)
B = C_8H_9NO
p-Aminoacetophenone

°C	Wt. % A
A	
80.6	100
A + AB	
73.0E	91
AB	
94.0	**62.7**
AB + B	
85.0E	40
B	
105.0	0

1316. (219)
B = $C_{10}H_8$
Naphthalene

°C	Mol % A
A	
81.0	100
75.2	90
A + AB	
70.5E	84.5
AB	
79.0	80
90.5	70
94.8	60
96.5	**50**
95.2	40
90.0	30
80.1	20
AB + B	
72.5E	14
B	
75.2	10
80.0	0

1317. (134)
B = $C_{10}H_{16}O$
Camphor

°C	Wt. % A
A	
80.6	100
A + B	
52.0E	57
B	
103.6	30
(178.0	0)

1318. (449)
B = $C_{12}H_4N_6O_{12}S$
Picryl sulfide

A	
81.5	100
80.5	95

1318.—(*Continued*)

°C	Wt. % A
A + B	
78.5E	87.5
B	
99.0	80
122.2	70
145.7	60
163.2	50
176.5	40
187.2d	30

1319. (131)
B = $C_{12}H_5N_7O_{12}$
Hexanitrodiphenylamine

A	
80.6	100
A + B	
78.2E	90

1320. (265)
B = $C_{12}H_9N$
Carbazole

A	
81.5	100
A + AB	
75.0E	95.2
AB	
93.0	90
121.5	80
AB + B	
142.0U	68.5
B	
167.0	60
189.0	50
205.5	40
218.0	30
226.5	20
232.0	10
234.0	5
236.0	0

1321. (109, 132, 265)
B = $C_{12}H_{10}$
Acenaphthene

A	
80.5	100
76.0	95
A + AB	
73.0E	92
AB	
101.0	80
109.5	70
112.0	**60**
110.0	50
103.5	40
94.5	30
AB + B	
81.0E	18
B	
87.5	10
91.5	5
95.0	0

The references differ greatly on the acenaphthene side of the system

1322. (132)
B = $C_{12}H_{11}N$
Diphenylamine

°C	Wt. % A
A	
80.6	100
A + B	
31.0E	*ca.* 47
B	
52.5	0

The author believed a compound to be present, due to supercooling in the neighborhood of the eutectic

1323. (137)
B = $C_{12}H_{11}N_3$
p-Aminoazobenzene

A	
79.5	100
A + AB	
67.0E	81
AB	
81.0	**53.5**
AB + B	
79.0E	46
B	
122.3	0

1324. (230)
B = $C_{13}H_{10}$
Fluorene

A	
82.0	100
75.9	90
A + AB	
71.5E	83
AB	
83.4	70
85.0	**57.7**
83.2	50
AB + B	
78.5E	42.5
B	
92.0	30
99.7	20
106.2	10
112.5	0

1325. (109, 252)
B = $C_{14}H_{10}$
Anthracene

A	
82.0	100
A + B	
73.0E	94
B	
86.0	90
112.0	80
134.5	70
153.0	60
169.0	50
182.5	40
192.5	30
200.5	20

1325.—(*Continued*)

°C	Wt. % A
B	
207.0	10
210.0	5
212.5	0

1326. (228)
B = $C_{14}H_{10}$
Phenanthrene

A	
80.0	100
77.5	95
74.0	90
A + AB	
69.0E	85
AB	
74.5	80
82.7	70
87.5	**56**
86.1	50
80.0	40
AB + B	
75.5E	35.8
B	
82.0	30
91.5	20
98.7	10
101.0	5
103.0	0

1327. (133)
B = $C_{17}H_{14}O$
Cinnamylideneacetophenone

A	
80.6	100
A + A_2B	
73.3E	90
A_2B	
87.5	**66**
A_2B + B	
75.0E	37
B	
100.0	0

1328. (109)
B = $C_{18}H_{18}$
Retene

A	
78.8	100
A + AB	
63.9E	73.2
AB	
78.6	**49.2**
AB + B	
65.4E	30.7
B	
95.2	0

1329. (243)
B = $C_{19}H_{16}O$
Triphenyl carbinol

A	
81.0	100
A + B	
76.0E	92
B	
159.5	0

v. also 564, 594, 636, 714, 738, 1189, 1228, 1241, 1254, 1268.1, 1307, 1872, 1873

$C_7H_5N_3O_7$
Trinitroanisole

1330. (449)
B = $C_{12}H_4N_6O_{12}S$
Picryl sulfide

°C	Wt. % A
A	
64.8	100
64.0	95
A + B	
62.5E	87
B	
92.3	80
119.3	70
142.3	60
163.3	50
175.3	40
190.3d	30?

$C_7H_5N_3O_7$
Trinitrocresol

1331. (411, 412)
B = $C_{10}H_8$
Naphthalene

°C	Mol % A
A	
103	100
93	95.3
A + AB	
88.5E	94.5
AB	
91	91.1
103	82.6
118	72.6
124	55.1
124.5	**50.0**
124	44.1
120	34.5
113	26.0
105	18.4
93.0	11.7
AB + B	
76.4E	5.55
B	
80.0	0

$C_7H_5N_5O_8$
Trinitrophenylmethylnitroamine (Tetryl)

1332. (131)
B = $C_7H_7NO_2$
p-Nitrotoluene

°C	Wt. % A
A + B	
44.4E	24
B	
53.0	0

v. also 8, 25, 49, 328, 501, 565, 595, 1032, 1036, 1268.2, 1308

C_7H_6ClNO
o-Chloroformanilide

1333. *v.* p. 178
B = C_7H_6ClNO
p-Chloroformanilide

$C_7H_6ClNO_2$
2-Chloro-3-nitrotoluene

1334. *v.* p. 178
B = $C_7H_6ClNO_2$
2-Chloro-4-nitrotoluene

1335. *v.* p. 178
B = $C_7H_6ClNO_2$
2-Chloro-5-nitrotoluene

1336. (479)
B = $C_7H_6ClNO_2$
2-Chloro-6-nitrotoluene

°C	Mol % A
A	
22.1	100
A + A_3B_2	
18.0E	90
A_3B_2	
19.3	**60**
A_3B_2 + B	
17.0E	30
B	
35.3	0

1337. *v.* p. 179
B = $C_7H_6ClNO_2$
3-Chloro-4-nitrotoluene

1338. *v.* p. 179
B = $C_7H_6ClNO_2$
3-Chloro-6-nitrotoluene

$C_7H_6ClNO_2$
2-Chloro-4-nitrotoluene

1339. (479)
B = $C_7H_6ClNO_2$
2-Chloro-5-nitrotoluene

°C	Mol % A
A	
62.3	100
A + AB	
32.0E	53
AB	
32.1	**50**
AB + B	
27.0E	35
B	
42.9	0

1340. *v.* p. 179
B = $C_7H_6ClNO_2$
2-Chloro-6-nitrotoluene

v. also 1334

$C_7H_6ClNO_2$
2-Chloro-5-nitrotoluene

1341. *v.* p. 179
B = $C_7H_6ClNO_2$
2-Chloro-6-nitrotoluene

v. also 1335, 1339

$C_7H_6ClNO_2$
3-Chloro-4-nitrotoluene

1342. *v.* p. 179
B = $C_7H_6ClNO_2$
3-Chloro-6-nitrotoluene

v. also 1337

$C_7H_6ClNO_2$
3-Chloro-6-nitrotoluene

v. 1338, 1342

$C_7H_6ClNO_2$
4-Chloro-2-nitrotoluene

1343. *v.* p. 179
B = $C_7H_6ClNO_2$
4-Chloro-3-nitrotoluene

$C_7H_6ClNO_2$
o-Nitrobenzyl chloride

1344. (173)
B = $C_7H_6ClNO_2$
p-Nitrobenzyl chloride

°C	% A
A	
47.9	100
43.9	90
39.5	80
34.5	70
A + B	
31.8E	64.6
B	
35.5	60
43.5	50
50.7	40
57.1	30
62.7	20
67.6	10
72.4	0

v. also 979, 1874

$C_7H_6ClNO_2$
m-Nitrobenzyl chloride

v. 1874

$C_7H_6ClNO_2$
p-Nitrobenzyl chloride

v. 1344, 1874

$C_7H_6Cl_2$
o-Chlorobenzyl chloride

1345. (466)
B = $C_7H_6Cl_2$
p-Chlorobenzyl chloride

°C	% A
A	
−19.4	100
A + B	
−30.0E	78
B	
+27.9	0

$C_7H_6N_2O_3$
o-Nitroformanilide

1346. *v.* p. 179
B = $C_7H_6N_2O_3$
p-Nitroformanilide

$C_7H_6N_2O_4$
2, 4-Dinitrotoluene

1347. *v.* p. 179
B = $C_7H_6N_2O_4$
2, 6-Dinitrotoluene

1348. (258)
B = $C_7H_6O_2$
m-Hydroxybenzaldehyde

°C	Wt. % A
A	
70.5	100
A + B	
55.0E	76
B	
105.0	0

1349. *v.* p. 179
B = $C_7H_7NO_2$
o-Nitrotoluene
v. also 1875

1350. *v.* p. 179
B = $C_7H_7NO_2$
p-Nitrotoluene
v. also 1872, 1875

1351. (244, 256)
B = C_7H_9N
p-Toluidine

°C	Wt. % A
A	
70.0	100
65.4	95
60.5	90
50.9	80
40.6	70
28.8	60
A + B	
15.5E	50
B	
25.4	40
31.2	30
35.8	20
39.8	10
41.5	5
43.5	0

1352. (222)
B = $C_{10}H_8$
Naphthalene

°C	Mol % A
A	
71.5	100
65.9	90
59.8	80
A + AB	
55.0E	72.5
AB	
58.9	60
60.1	**50**
59.0	40
AB + B	
57.0E	32.5
B	
67.7	20
75.0	10
80.1	0

1353. (237)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Wt. % A
A	
70.0	100
63.2	90
A + AB	
53.0E	77
AB	
57.5	70
62.0	**56**
60.8	50
54.8	40
44.7	30
AB + B	
34.0E	21.2
B	
41.9	10
48.0	0

1354. (237)
B = $C_{10}H_9N$
β-Naphthylamine

A	
70.0	100
63.2	90
55.2	80
A + B	
42.0E	65.5
B	
53.4	60
70.0	50
81.0	40
90.5	30
97.6	20
103.6	10
109.0	0

1355. (265)
B = $C_{12}H_9N$
Carbazole

A	
68.0	100
66.0	95
A + B	
62.0E	89

1355.—(*Continued*)

°C	Wt. % A
B	
106.0	80
135.0	70
158.5	60
179.0	50
197.0	40
212.0	30
222.0	20
230.0	10
233.4	5
236.0	0

1356. (132, 239)
B = $C_{12}H_{10}$
Acenaphthene

A	
71.0	100
67.3	95
63.7	90
57.3	80
A + AB	
54.8E	75
AB	
60.2	60
61.0	**54.1**
AB + B	
60.8E	49
B	
68.5	40
75.5	30
82.3	20
88.5	10
91.5	5
94.5	0

1357. (132)
B = $C_{12}H_{11}N$
Diphenylamine

A	
71.0	100
A + B	
28.2E	43
B	
52.5	0

1358. *v.* p. 179
B = $C_{13}H_{10}$
Fluorene

1359. (252)
B = $C_{14}H_{10}$
Anthracene

A	
70.5	100
68.0	95
A + B	
66.0E	91
B	
109.5	80
134.5	70
153.0	60
168.0	50
180.0	40
189.7	30
198.2	20
205.6	10
209.2	5
212.5	0

$C_7H_6N_2O_4$.—(*Continued*)

1360. (228)
B = $C_{14}H_{10}$
Phenanthrene

°C	Wt. % A
A	
69.0	100
66.7	95
64.3	90
58.8	80
51.7	70
41.5	60
A + B	
37.0E	55.9
B	
48.5	50
64.8	40
77.5	30
88.0	20
96.6	10
100.4	5
103.5	0

1361. (243)
B = $C_{19}H_{16}O$
Triphenyl carbinol

A	
68.5	100
A + B	
65.0E	88
B	
159.5	0

v. also 77, 596, 716, 739, 980, 1191, 1218, 1229, 1242, 1255, 1309, 1872, 1875

$C_7H_6N_2O_4$
2, 6-Dinitrotoluene

1362. *v.* p. 179
B = $C_7H_7NO_2$
p-Nitrotoluene

1363. (244)
B = C_7H_9N
p-Toluidine

A	
63.5	100
A + B	
18.0E	45
B	
44.0	0

1364. (244)
B = $C_{10}H_9N$
α-Naphthylamine

A	
63.5	100
A + B	
7.5E	38
B	
49.0	0

1365. (244)
B = $C_{10}H_9N$
β-Naphthylamine

°C	Wt. % A
A	
63.5	100
A + B	
45.0E	76
B	
110.0	0

1366. (244)
B = $C_{12}H_{10}$
Acenaphthene

A	
63.5	100
A + B	
46.0E	73
B	
94.0	0

1367. (244)
B = $C_{13}H_{10}$
Fluorene

A	
63.6	100
A + B	
46.0E	70
B	
112.5	0

1368. (244)
B = $C_{14}H_{10}$
Anthracene

A	
63.5	100
A + B	
54.0E	94
B	
212.5	0

1369. (228)
B = $C_{14}H_{10}$
Phenanthrene

°C	Mol % A
A	
65.0	100
A + B	
40.0E	63.5
B	
103.5	0

v. also 981, 1192, 1310, 1347

$C_7H_6N_2O_4$
3, 4-Dinitrotoluene

1370. (244)
B = C_7H_9N
p-Toluidine

°C	Wt. % A
A	
58.5	100
A + B	
11.3E	59
B	
44.0	0

1371. (244)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Wt. % A
A	
+58.5	100
A + B	
−10.0E	46
B	
+47.8	0

1372. (244)
B = $C_{10}H_9N$
β-Naphthylamine

A	
58.5	100
A + B	
33.0E	72
B	
109.4	0

1373. (244)
B = $C_{12}H_{10}$
Acenaphthene

A	
58.5	100
A + B	
39.0E	70
B	
94.0	0

1374. (244)
B = $C_{13}H_{10}$
Fluorene

A	
58.5	100
A + B	
37.2E	71
B	
112.0	0

1375. (244)
B = $C_{14}H_{10}$
Anthracene

A	
58.5	100
A + B	
55.0E	98
B	
212.0	0

1376. (228)
B = $C_{14}H_{10}$
Phenanthrene

°C	Mol % A
A	
59.0	100
A + B	
33.0E	66
B	
103.5	0

v. also 982, 1193

$C_7H_6N_2O_4$
3, 5-Dinitrotoluene

1377. (244)
B = C_7H_9N
p-Toluidine

°C	Wt. % A
A	
82.0	100
A + AB	
25.0U	50
AB + B	
22.0E	39
B	
44.0	0

1378. (244)
B = $C_{10}H_9N$
α-Naphthylamine

A	
82.2	100
A + AB	
75.0E	88
AB	
107.8	**56**
AB + B	
40.0E	13
B	
48.8	0

1379. (244)
B = $C_{10}H_9N$
β-Naphthylamine

A	
82.2	100
A + AB	
53.0E	73
AB	
53.0	73–60
AB + B	
53.0U	60
B	
108.4	0

1380. (244)
B = $C_{12}H_{10}$
Acenaphthene

A	
82.3	100
A + AB	
72.0E	85
AB	
94.0	**54.1**
AB + B	
79.0E	27
B	
94.0	0

1381. (244)
B = $C_{13}H_{10}$
Fluorene

A	
82.3	100
A + B	
42.0E	61
B	
112.2	0

1382. (244)
B = $C_{14}H_{10}$
Anthracene

A	
82.3	100
A + B	
76.0E	86
B	
212.0	0

v. also 1194

$C_7H_6N_2O_5$
2, 4-Dinitroanisole

1383. (164)
B = $C_7H_6N_2O_5$
2, 6-Dinitroanisole

°C	Wt. % A
A	
86.0	100
82.0	93.73
78.05	88.23
73.7	82.89
72.7	81.02
67.4	74.84
A + B	
61.8E	*ca.* 63.3
B	
117.5	0

1384. *v.* p. 179
B = $C_8H_8N_2O_5$
2,4-Dinitrophenetole

$C_7H_6N_2O_5$
2, 6-Dinitroanisole
v. 1383

C_7H_6O
Benzaldehyde, *v.* 134

$C_7H_6O_2$
o-Hydroxy-benzaldehyde
v. 136, 982.1

$C_7H_6O_2$
m-Hydroxy-benzaldehyde

1385. *v.* p. 179
B = $C_7H_6O_2$
Benzoic acid

1386. *v.* p. 179
B = $C_7H_6O_3$
Salicylic acid

1387. *v.* p. 179
B = $C_{10}H_8O$
α-Naphthol

1388. *v.* p. 179
B = $C_{10}H_8O$
β-Naphthol

v. also 137, 597, 717, 740, 760, 778, 877, 930, 982.2, 1050, 1091, 1117, 1144, 1170, 1311, 1348

$C_7H_6O_2$
p-Hydroxy-benzaldehyde

1389. (292)
B = $C_8H_{11}N$
Dimethylaniline

A	
+115.0	100
A + B	
− 3.0E	3
B	
+ 2.0	0

v. also 138, 982.3, 1051

$C_7H_6O_2$
Benzoic acid

1390. (195)
B = $C_7H_6O_3$
Salicylic acid

1391. (255)
B = C_7H_7NO
Benzamide

°C	Wt. % A
A	
121.0	100
114.8	90
108.1	80
100.3	70
A + A_xB_y	
85.5U	56
A_xB_y + B	
78.0E	46.5
B	
86.1	40
98.0	30
108.2	20
116.5	10
120.3	5
124.0	0

1392. (76.5, 344)
B = C_7H_8
Toluene

121.7	100
112.6	90
104.1	80
95.8	70
87.8	60
79.4	50
70.2	40
59.8	30
46.6	20
26.0	10
6.0	5

1393. (208)
B = $C_7H_8O_2$
Dimethylpyrone

°C	Mol % A
A	
121.0	100
117.2	95
113.1	90
108.6	85
103.2	80
95.9	75
87.2	70
75.7	65
59.6	60
A + AB	
48.0E	57
AB	
50.5	**50**
AB + B	
50.3E	48.5
B	
70.8	45
84.9	40
95.8	35

1393.—(*Continued*)

°C	Mol % A
B	
105.2	30
112.9	25
119.0	20
123.6	15
127.2	10
132.1	0

1394. [8, 12]
B = C_7H_9N
o-Toluidine

A	
121.4	100
113.5	90
105.2	80
95.7	70
84.6	60
70.5	50
53.3	40
30.3	30
A + AB	
+ 6.0U	23
AB	
−19.5	10
AB + B	
−31.5E	4.5
B	
−24.3	0

1395. [8, 12]
B = C_7H_9N
p-Toluidine

A	
121.4	100
113.2	90
104.0	80
90.5	70
72.0	60
A + AB	
52.4E	51.7
AB	
52.5	**50**
50.7	45
46.6	40
AB + B	
28.0E	30
B	
33.3	20
38.4	10
43.5	0

1396. *v.* p. 179
B = $C_8H_6O_3$
Piperonal

1397. *v.* p. 179
B = C_8H_8O
Acetophenone

1398. [209]
B = $C_8H_8O_2$
Phenylacetic acid

A	
121.4	100
114.3	90
106.7	80
98.0	70

1398.—(*Continued*)

°C	Mol % A
A	
87.8	60
75.5	50
60.1	40
A + B	
52.0E	35
B	
55.6	30
63.0	20
70.2	10
76.7	0

1399. [11]
B = C_9H_7N
Quinoline

A	
121.4	100
A + AB	
+23.0E	50
AB	
23.0	**50**
AB + B	
−40.6E	17
B	
−22.0	0

1400. *v.* p. 179
B = $C_9H_8O_2$
Cinnamic acid

1401. *v.* p. 179
B = $C_{10}H_8$
Naphthalene

1402. [11]
B = $C_{10}H_9N$
α-Naphthylamine

A	
121.4	100
A + B	
34.0	25
B	
48.2	0

1403. [11]
B = $C_{10}H_9N$
β-Naphthylamine

A	
121.4	100
A + B	
78.7E	50
B	
111.5	0

1404. [100, 204]
B = $C_{10}H_{16}O$
Camphor

A	
121.4	100
A + B	
56.5E	37.5
B	
178.0	0

1405. [248]
B = $C_{11}H_{12}N_2O$
Antipyrine

°C	Wt. % A
A	
121.0	100

1405.—(*Continued*)

°C	Wt. % A
A + AB	
59.5E	49.5
AB	
66.0	**39.3**
AB + B	
59.5E	31.7
B	
109.1	0

1406. [11]
B = $C_{12}H_{11}N$
Diphenylamine

°C	Mol % A
A	
121.4	100
A + B	
50.6E	8
B	
53.2	0

1407. *v.* p. 179
B = $C_{14}H_{10}O_2$
Benzil

v. also 9, 91, 113, 135, 177, 195, 279, 303, 329, 379, 409, 501.1, 511, 858, 983, 1190, 1289, 1292, 1294, 1300, 1306, 1385, 1869

$C_7H_6O_3$
Salicylic acid

1408. [231]
B = C_7H_7NO
Benzamide

°C	Wt. % A
A	
157.0	100
A + AB	
114.8E	64
AB	
116.0	**53.3**
AB + AB_2	
108.5E	36.5
AB_2	
108.5	**36.3**
AB_2 + B	
106.0E	24
B	
124.8	0

1409. [208]
B = $C_7H_8O_2$
Dimethylpyrone

°C	Mol % A
A	
158.9	100
155.8	95
152.3	90
147.3	85
140.8	80
132.7	75
122.3	70
109.3	65
89.1	60

1409.—(*Continued*)

°C	Mol % A
A + AB	
68.0E	56.5
AB	
71.9	**50**
69.8	45
AB + B	
68.0E	42.5
B	
93.4	35
105.7	30
114.4	25
120.1	20
124.6	15
127.9	10
132.1	0

1410. [100]
B = $C_{10}H_{16}O$
Camphor

A	
156.2	100
A + B	
55.0E	33.5
B	
178.0	0

1411. [36]
B = $C_{10}H_{18}O$
Cineole

°C	Wt. % A
A	
157.0	100
A + B	
−11.0E	20.5
B	
+ 1.0	0

1412. [238]
B = $C_{11}H_{12}N_2O$
Antipyrine

A	
155.0	100
A + AB	
72.0E	54.5
AB	
89.0	**43.2**
AB + B	
72.0E	26.5
B	
109.8	0

v. also 92, 304, 331, 365, 379.1, 410, 467.1, 985, 1386, 1390

$C_7H_6O_3$
m-Hydroxybenzoic acid

1413. [231]
B = C_7H_7NO
Benzamide

A	
193.0	100
A + AB	
81.4U	38
AB + B	
79.3E	35

1413.—(*Continued*)

°C	Wt. % A
B	
124.8	0

1414. [36]
B = $C_{10}H_{18}O$
Cineole

A	
200.0	100
A + B	
−13.0E	20
B	
+ 1.0	0

v. also 332, 987

$C_7H_6O_3$
p-Hydroxybenzoic acid

1415. [231]
B = C_7H_7NO
Benzamide

A	
(210.0	100)
A + AB_3	
74.9E	39
AB_3 + B	
79.8U	30
B	
124.8	0

1416. [36]
B = $C_{10}H_{18}O$
Cineole

A	
214.0	100
A + AB	
60.0U	20
AB + B	
−8.0E	3
B	
+1.0	0

v. also 333, 989

C_7H_7Br
o-Bromotoluene

1417. *v.* p. 179
B = C_7H_7Br
p-Bromotoluene

C_7H_7Br
p-Bromotoluene

1418. [375]
B = C_8H_{10}
p-Xylene

A	
26.74	100
24.8	95
22.7	90
18.2	80
A + A_xB_y	
12.0U	70
A_xB_y	
9.4	60
6.1	50
A_xB_y + B	
2.39E	39.22

1418.—(*Continued*)

°C	Wt. % A
B	
4.9	30
7.7	20
10.5	10
12.0	5
13.35	0

1419. [375]
B = $C_8H_{10}O_2$
Veratrole

A	
+26.74	100
A + B	
− 3.33E	52.6
B	
+22.22	0

1420. [375]
B = $C_{10}H_{14}O$
Thymol

A	
26.74	100
24.15	95
21.8	90
17.8	80
14.2	70
A + B	
11.35E	64.5
B	
22.7	50
28.8	40
34.2	30
39.5	20
44.5	10
46.8	5
49.2	0

1421. [375]
B = $C_{21}H_{21}N$
Tribenzylamine

A	
+26.73	100
A + B	
−14.19E	69.03
B	
+91.3	0

v. also 249, 487, 681, 991, 1052, 1267, 1417

C_7H_7Cl
o-Chlorotoluene

1422. *v.* p. 179
B = C_7H_7Cl
p-Chlorotoluene

C_7H_7Cl
Benzyl chloride

1423. [482]
B = C_7H_8O
Anisole

°C	Mol % A
A	
−41.1	100
−55.3	76.3
−63.0	67.0
−70.7	52.4

C_7H_7Cl.—(*Continued*)

1423.—(*Continued*)

°C	Mol % A
A + B	
−72.8E	50
B	
−70.5	47.2
−59.8	34.0
−46.2	16.4
−37.2	0

1424. (482)
B = C_7H_9N
Methylaniline

$C_7H_7ClN_2O_2$

6-Chloro-4-nitro-*m*-toluidine
1425. (343)
B = $C_7H_7ClN_2O_2$
6-Chloro-3-nitro-*p*-toluidine

Mix.	
158.5	100
139.0†	40
164.5	0

$C_7H_7ClO_2S$

o-Toluenesulfone chloride
1426. *v.* p. 179
B = $C_7H_7ClO_2S$
p-Toluenesulfone chloride

C_7H_7NO

α-Benzaldoxime
1427. (67)
B = C_7H_7NO
β-Benzaldoxime

°C	% A
A	
34.5	100
30.0	96.0
28.6	95.0
26.2	91.7
A + B	
25.5E	91.0
B	
46.0	73.7
79.0	49.2
101.0	26.2
131.0	0.0

α + β in stable equil. at 27.7° and 94% α

C_7H_7NO

Benzamide
1428. (269)
B = $C_8H_{10}N_2O$
Nitrosodimethylaniline

°C	Wt. % A
A	
121.5	100.0

1428.—(*Continued*)

°C	Wt. % A
A + AB_2	
65.0E	30
AB_2	
65.0	**26.4**
AB_2 + B	
65.0E	23
B	
84.5	0

1429. (231)
B = $C_{10}H_8O$
α-Naphthol

A	
124.8	100
A + B	
38.3E	41
B	
92.0	0

1430. (231)
B = $C_{10}H_8O$
β-Naphthol

A	
124.8	100
A + B	
54.3E	40
B	
122.0	0

1431. (240)
B = $C_{10}H_8O_2$
1, 4-Dihydroxy-naphthalene

A	
128.0	100
A + B	
91.0E	61.5
B	
183.0	0

1432. (240)
B = $C_{10}H_8O_2$
1, 5-Dihydroxy-naphthalene

A	
128.0	100
A + B	
106.0E	72
B	
250.0	0

1433. (240)
B = $C_{10}H_8O_2$
1, 6-Dihydroxy-naphthalene

A	
128.0	100
A + B	
90.0E	45
B	
135.0	0

1434. (240)
B = $C_{10}H_8O_2$
1, 8-Dihydroxy-naphthalene

A	
128.0	100

1434.—(*Continued*)

°C	Wt. % A
A + B	
46.0E	46
B	
137.0	0

1435. (240)
B = $C_{10}H_8O_2$
2, 3-Dihydroxy-naphthalene

A	
128.0	100
A + A_3B	
106.0E	75
A_3B	
113.0	**69.4**
A_3B + B	
80.0E	48
B	
162.0	0

1436. (240)
B = $C_{10}H_8O_2$
2, 6-Dihydroxy-naphthalene

A	
128.0	100
A + B	
87.0E	48
B	
216.0	0

1437. (240)
B = $C_{10}H_8O_2$
2, 7-Dihydroxy-naphthalene

A	
128.0	100
A + B	
78.0E	52
B	
186.0	0

1438. (255)
B = $C_{14}H_{10}O_3$
Benzoic anhydride

°C	Mol % A
A	
126.5	100
121.0	90
114.0	80
108.0	70
102.0	60
93.0	50
86.0	40
77.0	30
65.0	20
A + B	
37.0E	8
B	
42.0	0

v. also 280, 334, 458, 878, 906, 931, 1053, 1092, 1118, 1145, 1171, 1391, 1408, 1413, 1415

$C_7H_7NO_2$

o-Nitrotoluene
1439. *v.* p. 179
B = $C_7H_7NO_2$
m-Nitrotoluene
v. also 1876

1440. *v.* p. 179
B = $C_7H_7NO_2$
p-Nitrotoluene

v. also 859, 1312, 1349, 1873, 1875, 1876

$C_7H_7NO_2$

m-Nitrotoluene
1441. *v.* p. 179
B = $C_7H_7NO_2$
p-Nitrotoluene
v. also 1876

1442. (413)
B = $C_{12}H_{18}O_8$
Diethyl diacetyl-tartrate

°C	Mol % A
A	
16.1	100.0
14.0	95.55
A + B	
9.85E	86.2
B	
20.2	75.96
27.9	69.07
33.6	62.36
38.2	54.82
42.0	47.24
44.35	41.73
47.9	34.14
53.5	22.24
57.2	15.06
63.7	4.85
67.0	0.0

v. also 1439, 1876

$C_7H_7NO_2$

p-Nitrotoluene
1443. *v.* p. 179
B = $C_{10}H_8$
Naphthalene

1444. (130)
B = $C_{12}H_{11}N$
Diphenylamine

°C	Wt. % A
A	
53.0	100
A + B	
18.5E	49
B	
52.5	0

v. also 394, 741, 860, 1195, 1313, 1332, 1350, 1362, 1440, 1441, 1872, 1873, 1875, 1876

$C_7H_7NO_3$

p-Nitroanisole
1445. *v.* p. 179
B = $C_{12}H_{11}N$
Diphenylamine

v. also 395

C_7H_8

Toluene
1446. *v.* p. 179
B = $C_{10}H_8$
Naphthalene

1447. (475)
B = $C_{12}H_9N$
Carbazole

°C	g B per 100 g A
10.0	0.51
20.0	0.63
30.0	0.85
40.0	1.17
50.0	1.60
60.0	2.10
70.0	2.75
80.0	3.57
100.0	6.1

1448. *v.* p. 179
B = $C_{12}H_{10}$
Acenaphthene

1449. *v.* p. 179
B = $C_{13}H_{10}$
Fluorene

1450. *v.* p. 179
B = $C_{14}H_8O_2$
Anthraquinone

1451. *v.* p. 179
B = $C_{14}H_{10}$
Anthracene

1452. *v.* p. 179
B = $C_{14}H_{10}$
Phenanthrene

v. also 34, 233, 250, 396, 682, 879, 907, 932, 992, 1392

C_7H_8O

o-Cresol
1453. (90, 118)
B = C_7H_8O
m-Cresol

°C	Mol % A
A	
30.45	100
28.3	95
25.9	90
20.8	80
15.3	70
A + A_2B	
8.5U	58.5
A_2B	
8.0	50
7.0	40
5.4	30
A_2B + B	
1.5E	16.5

1453.—(*Continued*)

°C	Mol % A
B	
4.9	10
7.5	5
10.0	0

1454. (90, 118)
B = C_7H_8O
p-Cresol

A	
30.45	100
28.0	95
25.3	90
19.5	80
13.1	70
6.0	60
A + AB_2	
2.4E	55.5
AB_2	
5.8	50
8.2	40
8.7	**33.3**
AB_2 + B	
8.7E	33 3
B	
19.9	20
27.4	10
30.8	5
34.15	0

(158.1)

A	
30.08	100
27.7	95
24.8	90
18.0	80
10.1	70
A + AB	
0.0E	59
AB	
6.0	55
ca. **7.8**	**50**
7.6	45
6.5	40
AB + B	
1.57	36
B	
9.6	30
19.1	20
27.7	10
34.8	0

1455. (208)
B = $C_7H_8O_2$
Dimethylpyrone

A	
30.3	100
27.4	95
22.3	90
A + A_2B	
17.0E	86
A_2B	
36.0	80
44.8	75
49.5	70
50.4	**66.7**

1455.—(*Continued*)

°C	Mol % A
$A_2B + AB$	
46.0E	61.5
AB	
52.9	55
54.4	**50**
AB + B	
54.3E	49
B	
73.9	45
87.8	40
98.3	35
106.5	30
113.5	25
119.5	20
123.6	15
127.0	10
132.1	0

v. also 78, 139, 196, 221, 512, 598, 1054, 1196

C_7H_8O

m-Cresol

1456. (90, 118)

B = C_7H_8O

p-Cresol

°C	Mol % A
A	
10.0	100
6.7	95
$A + A_2B$	
3.0E	89
A_2B	
6.8	80
9.6	**66.7**
9.1	60
6.7	50
$A_2B + B$	
2.5E	41.5
B	
12.3	30
20.2	20
27.6	10
31.0	5
34.15	0

v. also 1863

1457. (208)

B = $C_7H_8O_2$

Dimethylpyrone

°C	Mol % A
A	
10.9	100
+ 5.9	95
− 2.0	90
$A + A_2B$	
− 9.0E	86.5
A_2B	
+12.2	80
20.2	75
24.6	70
25.4	**66.7**
22.7	60
$A_2B + B$	
20.0E	56.8

1457.—(*Continued*)

°C	Mol % A
B	
55.7	50
74.4	45
87.8	40
97.7	35
106.3	30
112.9	25
118.4	20
123.0	15
126.7	10
132.1	0

v. also 79, 140, 197, 222, 513, 599, 1055, 1197, 1453, 1863

C_7H_8O

p-Cresol

1458. (208)

B = $C_7H_8O_2$

Dimethylpyrone

°C	Mol % A
A	
34.1	100
29.0	95
21.9	90
+ 8.3	85
$A + A_2B$	
ca. −18.0E	80
A_2B	
+ 8.4	75
18.6	70
20.3	**66.7**
$A_2B + AB$	
19.0E	63
AB + B	
28.0U	55.5
B	
55.4	50
73.8	45
87.5	40
97.5	35
105.9	30
112.5	25
118.2	20
123.0	15
126.6	10
132.1	0

v. also 80, 141, 198, 223, 514, 600, 1056, 1198,1454,1456,1863

C_7H_8O

Anisole, *v.* 1423

$C_7H_8O_2$

Dimethylpyrone

1459. (208)

B = $C_8H_8O_2$

o-Toluic acid

°C	Mol % A
A	
132.1	100
125.9	90
122.1	85

1459.—(*Continued*)

°C	Mol % A
A	
116.9	80
110.8	75
103.7	70
95.0	65
84.9	60
72.7	55
58.5	50
A + AB	
47.5U	46.7
AB + B	
46.0E	43.7
B	
66.9	35
76.5	30
84.2	25
90.2	20
94.9	15
98.7	10
101.3	5
103.4	0

1460. (208)

B = $C_8H_8O_2$

m-Toluic acid

°C	Mol % A
A	
132.1	100
126.6	90
122.3	85
117.1	80
111.3	75
104.3	70
95.3	65
84.5	60
A + AB	
63.8E	52
AB	
64.1	**50**
62.8	45
AB + B	
58.7E	37.8
B	
65.7	35
77.2	30
86.7	25
94.0	20
99.2	15
103.0	10
105.7	5
107.6	0

1461. (208)

B = $C_8H_8O_2$

p-Toluic acid

°C	Mol % A
A	
132.1	100
127.9	90
124.8	85
120.9	80
115.4	75
107.8	70
97.8	65
A + AB	
85.0E	59.5
AB	
87.1	55

1461.—(*Continued*)

°C	Mol % A
AB + B	
88.0U	51.5
B	
114.3	45
127.3	40
138.0	35
146.7	30
154.0	25
160.2	20
165.5	15
170.3	10
174.6	5
178.5	0

1462. (208)

B = $C_8H_8O_2$

Phenylacetic acid

°C	Mol % A
A	
132.1	100
126.6	90
122.5	85
117.5	80
111.8	75
104.6	70
95.9	65
85.0	60
71.7	55
55.3	50
A + AB	
22.5U	43
AB	
20.8	40
23.2	35
AB + B	
15.5E	37
B	
38.0	30
48.8	25
57.6	20
64.1	15
69.2	10
73.3	5
76.7	0

1463. (208)

B = $C_8H_8O_3$

Mandelic acid

°C	Mol % A
A	
132.1	100
124.8	90
120.2	85
114.8	80
108.3	75
100.0	70
88.9	65
A + AB	
65.0E	57.6
AB	
67.2	55
69.3	**50**
$AB + AB_2$	
67.2E	44.5
AB_2	
71.2	40
74.0	**33.3**

1463.—(*Continued*)

°C	Mol % A
$AB_2 + B$	
73.9E	32.5
B	
79.5	30
88.9	25
96.7	20
103.0	15
108.6	10
113.4	5
117.0	0

1464. (208)

B = $C_9H_8O_2$

Cinnamic acid

°C	Mol % A
A	
132.1	100
126.3	90
122.3	85
117.7	80
111.9	75
105.2	70
96.9	65
86.8	60
A + AB	
72.5E	54.3
AB	
73.2	**50**
AB + B	
72.0E	42.7
B	
88.2	40
100.2	35
109.8	30
117.0	25
122.7	20
127.2	15
131.0	10
134.2	5
136.8	0

1465. (208)

B = $C_9H_{10}O_2$

Hydrocinnamic acid

°C	Mol % A
A	
132.1	100
126.8	90
118.6	80
106.0	70
97.7	65
87.4	60
75.3	55
60.1	50
42.0	45
+20.5	40
A + B	
− 2.0E	36.5
B	
+14.3	30
24.0	25
30.6	20
36.1	15
40.2	10
43.2	5
45.0	0

1466. (208)

B = $C_{10}H_8O$

α-Naphthol

°C	Mol % A
A	
132.1	100
126.6	90
123.2	85
119.0	80
113.0	75
105.5	70
96.8	65
83.5	60
A + AB	
65.0E	55
AB	
69.8	**50**
$AB + A_2B_3$	
69.8E	50
A_2B_3	
77.5	45
79.1	**40**
77.1	35
70.6	30
$A_2B_3 + B$	
53.0E	24
B	
67.2	20
79.4	15
86.6	10
91.8	5
96.1	0

1467. (208)

B = $C_{10}H_8O$

β-Naphthol

°C	Mol % A
A	
132.1	100
127.5	90
124.0	85
119.2	80
112.7	75
105.2	70
96.5	65
83.3	60
66.1	55
$A + A_2B_3$	
35.0E	49.5
A_2B_3	
37.8	45
$A_2B_3 + AB_2$	
39.5U	41
AB_2	
44.6	**33.3**
$AB_2 + B$	
44.0E	31.5
B	
80.0	25
95.3	20
106.0	15
113.2	10
118.0	5
121.6	0

v. also 61, 142, 178, 199, 281, 366, 367, 434, 436, 457, 566,

$C_7H_8O_2$.—(*Cont'd*)
501, 779, 880, 908, 933, 1057, 1304, 1314, 1393, 1409, 1455, 1457, 1458

$C_7H_8O_2$
Guaiacol

1468. (395, 396)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Mol % A
A	
28.1	100
A + AB	
14.3E	77
AB	
21.4	**50**
AB + B	
19.8E	40
B	
48.5	0

1469. (36)
B = $C_{10}H_{18}O$
Cineole

°C	Wt. % A
A	
30.0	100
A + AB	
2.5E	57
AB	
+ 5.0	**44.5**
AB + B	
− 5.0E	23
B	
+ 1.0	0

1470. (34)
B = $C_{13}H_{10}O_3$
Salol

A	
29.0	100
24.5	90
19.0	80
13.5	70
9.0	60
A + B	
3.0E	47
B	
8.0	40
16.5	30
25.0	20
33.0	10
42.0	0

v. also 200, 224, 602

C_7H_9N
Methylaniline
v. 1424

C_7H_9N
o-Toluidine
1471. *v.* p. 179
B = C_7H_9N
p-Toluidine

1472. (220)
B = $C_8H_{10}N_2O$
Nitrosodimethylaniline

°C	Mol % A
AB_2	
−17.0	94.8
+15.0	85.7
70.0	**33**
AB_2 + B	
66.7E	21.5
B	
86.0	0

v. also 281.1, 1058, 1199, 1394

C_7H_9N
m-Toluidine
1473. *v.* p. 179
B = C_7H_9N
p-Toluidine

v. also 281.2

C_7H_9N
p-Toluidine

1474. (220)
B = $C_8H_{10}N_2O$
Nitrosodimethylaniline

A	
43.0	100
A + AB_2	
27.2E	73.3
AB_2 + B	
48.5E	**33.3**
B	
86.0	0

1475. *v.* p. 180
B = $C_{10}H_8$
Naphthalene

1476. (381, 467)
B = $C_{10}H_8O$
α-Naphthol

A	
43.1	100
A + AB	
30.0E	81.5
AB	
53.6	**50**
AB + B	
52.0E	40
B	
93.9	0

1477. (247, 264, 467)
B = $C_{10}H_8O$
β-Naphthol

°C	Wt. % A
A	
43.5	100
A + AB	
38.2E	89
AB	
81.5	**42.6**

1477.—(*Continued*)

°C	Wt. % A
AB + B	
78.0E	33.5
B	
122.0	0

1478. (467)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Mol % A
A	
45	100.0
23	66.67
B	
14	50.0
25	33.3
50	0.0

1479. (467)
B = $C_{10}H_9N$
β-Naphthylamine

A	
45	100.0
28	66.67
B	
30.0	50.0
43.0	33.33
112	0.0

1480. (101)
B = $C_{10}H_{16}O$
Camphor

A	
45	100.0
A + AB	
+3.8E	**50**
AB + B	
−2.5E	42
B	
178.0	0

1481. (379)
B = $C_{10}H_{20}O$
Menthol

A	
45.0	100
41.2	89.22
33.8	72.98
29.5	59.34
21.7	46.26
A + B	
19.5E	43
B	
20.5	41.31
25.0	32.92
31.0	20.73
38.5	7.03
43.0	0.0

1482. (467)
B = $C_{12}H_{11}N$
Diphenylamine

A	
45	100
24.5	66.67
B	
29	50.0
35	33.3
54	0.0

1483. (260)
B = $C_{13}H_{10}O$
Benzophenone

°C	Wt. % A
A	
43.5	100
A + B	
6.0E	36
B	
47.1	0

1484. (467)
B = $C_{14}H_{10}$
Anthracene

°C	Mol % A
A	
45	100
B	
156	66.67
170	50.00
184	33.33
213	0.00

1485. (254)
B = $C_{19}H_{16}$
Triphenylmethane

°C	Wt. % A
A	
44.0	100
A + B	
33.0E	64
B	
89.2	0

1486. (271)
B = $C_{19}H_{16}O$
Triphenyl carbinol

A	
43.0	100
A + B	
36.2E	72
B	
159.2	0

v. also 281.3, 335, 459.81, 488, 718, 742, 761, 881, 909, 934, 1059, 1093, 1119, 1146, 1172, 1201, 1219, 1225, 1351, 1363, 1370, 1377, 1395, 1471, 1473, 1860

$C_7H_9NO_2S$
o-Toluenesulfonamide
1487. *v.* p. 180
B = $C_7H_9NO_2S$
p-Toluenesulfonamide

C_7H_{16}
Heptane
v. 1290, 1293, 1295

$C_7H_{16}O_4S_2$
Sulfonal

1488. (38)
B = $C_{10}H_8O$

1488.—(*Continued*)
β-Naphthol

°C	Mol % A
A	
124.5	100.0
120.0	90.0
110.0	74.0
100.0	64.3
90.0	56.0
80.0	48.7
A + B	
67.0E	39.0
B	
70.0	37.3
80.0	32.0
90.0	26.0
100.0	19.0
110.0	11.0
122.0	0.0

v. also 1877

1489. (38)
B = $C_{13}H_{10}O_3$
Salol

A	
124.5	100.0
120	85.0
110	60.0
100	43.0
90	31.0
80	24.5
70	20.0
60	16.7
50	13.8
40	11.5
A + B	
34E	10.0
B	
42.5	0.0

v. also 1877

$C_8H_4Cl_2O_2$
sym-Phthalyl chloride
1490. *v.* p. 180
B = $C_8H_4Cl_2O_2$
asym-Phthalyl chloride

$C_8H_4O_3$
Phthalic anhydride

1491. (341)
B = $C_8H_6O_4$
Phthalic acid

A	
130.84	100
A + B	
129.74E	98.25
B	
146.4	95
(*ca.* 208	0)

1492. *v.* p. 180
B = $C_{10}H_8$
Naphthalene

1493. (100)
B = $C_{10}H_{16}O$
Camphor

°C	Mol % A
A	
128.5	100
A + B	
84.7E	31
B	
178.0	0

v. also 26

$C_8H_5Br_3O_2$
Acetyltribromophenol, *v.* 541

$C_8H_5NO_5$
Nitropiperonal
v. 143

$C_8H_6BrClO_2$
Phenyl bromochloroacetate

1494. (81)
B = $C_8H_6Cl_2O_2$
Phenyl dichloroacetate

Mix.	
43.7	100
46.25	0

$C_8H_6O_2$
Phthalide

1495. (294)
B = $C_{19}H_{17}N_3$
Triphenylguanidine

°C	Wt. % A
A_s	
72.8	100
A_m	
65.0	100
$A_s + B_m$	
51.5E	72
$A_m + B_m$	
49.4E	70
$A_s + B_s$	
60.5E	68
$A_m + B_s$	
58.0E	66
B_m	
138.0	0
B_s	
142.4	0

v. also 305

$C_8H_6O_3$
Piperonal

1496. (114)
B = $C_{12}H_{10}$
Acenaphthene

A	
80.2	100
A + B	
67.5E	69
B	
92.5	0

v. also 144, 201, 225, 1396

$C_8H_6O_3$
o-Aldehydobenzoic acid
v. 993

$C_8H_6O_3$
m-Aldehydobenzoic acid
v. 994

$C_8H_6O_3$
p-Aldehydobenzoic acid
v. 995

$C_8H_6O_4$
o-Phthalic acid
v. 93, 336, 411, 1491

$C_8H_7BrClNO$
2-Bromo-4-chloro-acetanilide
1497. (355)
B = $C_8H_7BrClNO$
4-Bromo-2-chloro-acetanilide

°C	% A
Mix.	
151.4	100
134.6	0

v. also 337

$C_8H_7BrClNO$
4-Bromo-2-chloro-acetanilide
1498. (355)
B = $C_8H_7Br_2NO$
2, 4-Dibromo-acetanilide

°C	% A
Mix.	
151.4	100
144.7	0

1499. (355)
B = $C_8H_7Cl_2NO$
2, 4-Dichloro-acetanilide

Mix.	
151.4	100
144.1	0

v. also 338, 1497

$C_8H_7Br_2NO$
2, 4-Dibromo-acetanilide
v. 339, 1498

$C_8H_7ClN_2O_3$
4-Nitro-2-chloro-acetanilide
1500. (62)
B = $C_8H_7ClN_2O_3$
6-Nitro-2-chloro-acetanilide

1500.—(*Continued*)

°C	% A
A	
141.9	100
A + B	
127.5E	77.5
B	
192.2	0

$C_8H_7ClN_2O_3$
4-Nitro-3-chloro-acetanilide
1501. (62)
B = $C_8H_7ClN_2O_3$
6-Nitro-3-chloro-acetanilide

A	
144.0	100
A + B	
98.0E	38
B	
117.4	0

$C_8H_7Cl_2NO$
2, 4-Dichloro-acetanilide
1502. (355)
B = C_8H_8ClNO
4-Chloroacetanilide

°C	Mol % A
A	
144.1	100
A + B	
127.6E	61.9
B	
179.0	0

v. also 340, 1499

$C_8H_7NO_4$
o-Nitrophenyl acetate
v. 882

$C_8H_7N_3O_5$
2, 4-Dinitro-acetanilide
1504. *v.* p. 180
B = $C_8H_8N_2O_3$
p-Nitroacetanilide

$C_8H_7N_3O_6$
2, 4, 6-Trinitro-*m*-xylene
v. 637, 1268.3

C_8H_8BrNO
p-Bromoacetanilide
v. 341

C_8H_8ClNO
2-Chloroacetanilide
1505. (354.5)
B = C_8H_8ClNO
4-Chloroacetanilide

°C	Wt. % A
A	
86.8	100
A + B	
77.0E	14.5

1505.—(*Continued*)

°C	Wt. % A
B	
179.0	0

v. also 996

C_8H_8ClNO
3-Chloroacetanilide
v. 997

C_8H_8ClNO
4-Chloroacetanilide
v. 342, 998, 1502, 1505

$C_8H_8N_2O_3$
o-Nitroacetanilide
v. 999

$C_8H_8N_2O_3$
m-Nitroacetanilide
v. 1000

$C_8H_8N_2O_3$
p-Nitroacetanilide
v. 1001, 1504

$C_8H_8N_2O_4$
2, 3-Dinitro-*p*-xylene
1506. (40)
B = $C_8H_8N_2O_4$
2, 6-Dinitro-*p*-xylene

°C	Mol % A
A	
91.6	100
A + AB	
81.8E	83
AB	
96.2	**50**
AB + B	
95.8E	44
B	
122.0	0

$C_8H_8N_2O_5$
2, 4-Dinitro-phenetole
v. 1384

C_8H_8O
Acetophenone
1507. (249)
B = $C_{10}H_8O$
α-Naphthol

°C	Wt. % A
A	
20.0	100
A + AB	
0.0	68
AB + B	
13.0U	**45.5**
B	
93.2	0

1508. (249)
B = $C_{10}H_8O$
β-Naphthol

1508.—(*Continued*)

°C	Wt. % A
A	
20.0	100
A + AB	
2.0E	68
AB + B	
8.0U	54
B	
121.5	0

v. also 145, 202, 603, 780, 883, 910, 935, 1002, 1060, 1094, 1120, 1147, 1173, 1397

$C_8H_8O_2$
Anisaldehyde
v. 146

$C_8H_8O_2$
Aldehydohydroxy-methylbenzenes
v. 1002.1, 1002.2, 1002.3

$C_8H_8O_2$
Phenylacetic acid
1509. *v.* p. 180
B = $C_9H_{10}O_2$
Hydrocinnamic acid

v. also 94, 147, 179, 203, 343, 412, 604, 1398, 1462

$C_8H_8O_2$
o-Toluic acid
v. 148, 180, 204, 605, 1459

$C_8H_8O_2$
m-Toluic acid
v. 149, 181, 205, 606, 1460

$C_8H_8O_2$
p-Toluic acid
v. 150, 182, 206, 1461

$C_8H_8O_2$
Methyl benzoate
v. 151

$C_8H_8O_3$
d-Mandelic acid
1510. (1, 72)
B = $C_8H_8O_3$
l-Mandelic acid

A	
132.8	100
130.4	95
128.0	90
123.2	80
118.0	70
A + AB	
113.0E	61.5

1510.—(*Continued*)

°C	Wt. % A
AB	
118.0	**50**
AB + B	
113.0E	38.5
B	
118	30
123.2	20
128.0	10
130.4	5
132.8	0

$C_8H_8O_3$
l-Mandelic acid
v. 427, 1510

$C_8H_8O_3$
dl-Mandelic acid
v. 95, 344, 413, 1463

$C_8H_8O_3$
Methyl salicylate
1511. (36)
B = $C_{10}H_{18}O$
Cineole

A	
+ 1.0	100
A + AB	
−41.5E	78
AB	
−15.0	**49.7**
AB + B	
−18.0E	39
B	
+ 1.0	0

$C_8H_8O_3$
Vanillin
1512. (114)
B = $C_{12}H_{10}$
Acenaphthene

°C	Wt. % A
A	
80.2	100
A + B	
67.5E	69
B	
92.5	0

v. also 152, 207

C_8H_9NO
p-Amino-acetophenone
v. 544, 1315

C_8H_9NO
Acetanilide
1513. (65)
B = $C_{11}H_{12}N_2O$
Antipyrine

°C	Mol % A
A	
113.5	100
109.0	90
100.0	80
85.0	70
73.7	65
60.0	60

1513.—(*Continued*)

°C	Mol % A
A + B	
45.0E	55
B	
58.0	50
68.5	45
78.0	40
85.0	35
90.0	30
99.0	20
107.0	10
113.0	0

v. also 96, 345, 397, 743, 781, 1002.4, 1033, 1061

$C_8H_9NO_3$
α-*N*-Acetylbenzoyl-hydroxylamine
1514. (67)
B = $C_8H_9NO_3$
β-*N*-Acetylbenzoyl-hydroxylamine

A	
99	100
A + B	
65.5E	25
B	
70	0

A + B in stable equil. at 95° and 93% A

C_8H_{10}
m-Xylene
v. 1029.1, 1033.1, 1036.1, 1121

C_8H_{10}
p-Xylene
1515. (375)
B = $C_8H_{10}O_2$
Veratrole

°C	Wt. % A
A	
13.35	100.0
8.04	82.83
4.03	70.03
+1.47	62.26
−1.51	55.63
A + B	
−4.00E	51.01
B	
−1.99	42.65
+1.73	36.78
5.85	29.19
10.64	20.32
16.10	10.41
19.87	4.10
22.40	0.00

1516. *v.* p. 180
B = $C_{13}H_{10}$
Fluorene

C_8H_{10}.— (*Continued*)
v. also 251, 282, 424, 428, 489, 1003, 1062, 1268, 1269, 1283, 1418

$C_8H_{10}N_2$
α-Acetaldehyde-phenylhydrazone
1517. (420.5)
B = $C_8H_{10}N_2$
β-Acetaldehyde-phenylhydrazone

°C	Mol % A
Mix.	
98.6	100
56.0	0

$C_8H_{10}N_2O$
p-Nitrosomono-ethylaniline
1518. (201)
B = $C_8H_{10}N_2O_2$
p-Nitromono-ethylaniline

Mix.	
74.1	100
54.0†	70
94.0	0

$C_8H_{10}N_2O$
Nitrosodimethyl-aniline
1519. (220)
B = $C_8H_{11}N$
m-Xylidine

A	
86.0	100
A + A_2B_3	
47.0E	63.3
A_2B_3	
47.8	**40**
A_2B_3 + AB_3	
25.3E	30
AB_3	
26.0	**25**

1520. (269)
B = C_9H_7N
Quinoline

°C	Wt. % A
+84.5	100
−12.0	23.8

1521. (269)
B = $C_{10}H_9N$
α-Naphthylamine

A	
84.5	100
A + A_2B	
72.0E	87.5
A_2B	
84.0	**67.5**
A_2B + B	
30.5E	12
B	
48.1	0

1522. (220)
B = $C_{10}H_9N$
β-Naphthylamine

°C	Mol % A
A	
86.0	100
A + A_3B_2	
73.5E	84.5
A_3B_2	
86.2	**60**
A_3B_2 + B	
81.8E	35.5
B	
110.0	0

1523. (269)
B = $C_{13}H_9N$
Acridine
v. also 306, 515, 1063, 1202, 1230, 1243, 1256, 1428, 1472, 1474

$C_8H_{10}N_2O$
Acetylphenylene-diamines
v. 1003.1, 1003.2, 1003.3

$C_8H_{10}N_2O_2$
p-Nitromonoethyl-aniline
v. 1518

$C_8H_{10}N_4O_2$
Caffeine
1524. *v.* p. 180
B = $C_{11}H_{12}N_2O$
Antipyrine
v. also 10, 50, 346, 502, 1004

$C_8H_{10}O_2$
Veratrole
v. 1419, 1515

$C_8H_{11}N$
Dimethylaniline
1525. *v.* p. 180
B = $C_{13}H_{12}O$
Benzhydrol
1526. *v.* p. 180
B = $C_{17}H_{20}N_2O$
Tetramethyldi-aminobenzo-phenone
v. also 282.1, 837, 1064, 1389

$C_8H_{11}N$
m-Xylidine
v. 1065, 1203, 1519

$C_8H_{14}O_4$
Diethyl succinate
v. 153

$C_8H_{18}O$
Octyl alcohol, *v.* 81

$C_9H_6O_2$
Coumarin
v. 567

C_9H_7BrO
α-Bromocinnamic aldehyde
1527. (288)
B = C_9H_7ClO
α-Chlorocinnamic aldehyde

°C	Mol % A
Mix.	
69.56	100
31.22	0

C_9H_7N
Quinoline
v. 838, 1066, 1399, 1520

C_9H_8
Indene
1528. *v.* p. 180
B = $C_{10}H_8$
Naphthalene

1529. *v.* p. 180
B = $C_{12}H_{10}$
Acenaphthene

1530. *v.* p. 180
B = $C_{13}H_{10}$
Fluorene

$C_9H_8O_2$
Cinnamic acid
1530.1. (274.1)
B = $C_{10}H_8O$
α-Naphthol

°C	Wt. % A
A	
133.0	100
A + B	
68.0E	37
B	
95.0	0

1530.2. (274.1)
B = $C_{10}H_8O$
β-Naphthol

A	
133.0	100
A + B	
87.0E	48
B	
121.0	0

1531. (101)
B = $C_{10}H_{16}O$
Camphor

°C	Mol % A
A	
133.0	100
A + B	
71.5E	36.6
B	
178.0	0

v. also 154, 183, 208, 606.1, 781.1, 883.1, 910.1, 935.1, 1066.1, 1094.1, 1121.1, 1147.1, 1173. 1, 1400, 1464

$C_9H_{10}O_2$
Hydrocinnamic acid
v. 97, 347, 414, 1465, 1509

$C_9H_{10}O_2$
Ethyl benzoate
v. 155

$C_9H_{10}O_2$
Methyl *p*-toluate
v. 156

$C_9H_{10}O_3$
Methyl *d*-mandelate
1532. (72)
B = $C_9H_{10}O_3$
Methyl *l*-mandelate

°C	Mol % A
A	
54.6	100
53.1	95
51.7	90
48.9	80
A + AB	
46.0E	70
AB	
48.8	60
50.0	**50**
48.8	40
AB + B	
46.0E	30
B	
48.9	20
51.7	10
53.1	5
54.6	0

$C_9H_{10}O_3$
Methyl anisate
v. 157

$C_9H_{11}NO$
o-Acettoluide
1533. (169)
B = $C_9H_{11}NO$
p-Acettoluide

°C	% A
A	
109.15	100.0
107.75	97.58
103.2	90.42
100.8	86.4
B	
147.0	0

C_9H_{12}
Mesitylene
v. 1284

$C_9H_{12}N_2O$
p-Nitrosopropyl-aniline
1534. (201)
B = $C_9H_{12}N_2O_2$
p-Nitropropyl-aniline

°C	Wt. % A
Mix.	
56.5	100
40.5†	40.5
62.9	0

$C_9H_{13}N$
2, 4, 6-Trimethyl-aniline
v. 282.2

$C_{10}H_{15}NO$
d-Carvoxime
1535. (1)
B = $C_{10}H_{15}NO$
l-Carvoxime

°C		Mol % A
A		
72.0		100
Mixed crystals		
t_L	t_S	
A + AB		
75.4	73.0	95
79.0	75.0	90
84.6	80.0	80
88.2	85.0	70
90.4	89.0	60
AB		
91.4		**50**
AB + B		
90.4	89.0	40
88.2	85.0	30
84.6	80.0	20
79.0	75.0	10
75.4	73.0	5
72.0		0

$C_{10}H_5N_3O_6$
1, 2, 5-Trinitro-naphthalene
1536. (369)
B = $C_{10}H_5N_3O_6$
1, 3, 5-Trinitro-naphthalene

°C	Wt. % A
Mix.	
114.0	100
115.0	90
117.0	80
120.0	70
122.5	60
124.0	50
124.5	40
125.0	30
125.5	20
126.0	10
126.0	0

v. also 1878

1537. (369)
B = $C_{10}H_5N_3O_6$
1, 3, 8-Trinitro-naphthalene

°C	Wt. % A
A	
114.0	100
110.0	90
105.5	80
101.0	70
A + B	
96.0E	60
B	
153.0	50
174.0	40
186.0	30
196.0	20
205.0	10
214.0	0

1538. (369)
B = $C_{10}H_5N_3O_6$
1, 4, 5-Trinitro-naphthalene

Mix.	
114.0	100
124.0	90
128.5	80
Immiscible liquids	
130.0	70
130.0	60
130.0	50
130.0	40
130.0	30
Mix.	
134.0	20
140.5	10
147.5	0

v. also 1878

$C_{10}H_5N_3O_6$
1, 3, 5-Trinitro-naphthalene
1539. (369)
B = $C_{10}H_5N_3O_6$
1, 3, 8-Trinitro-naphthalene

°C t_L	°C t_S	Mol % A
A		
126.0		100
122.5	120.0	95
120.0	118.0†	90
118.6	116.5	85
A + Mix. (A + A_3B)		
104.0E		77.5
A_3B		
112.5		**75**
Mix. (A_3B + AB)		
107.5	97.0	70
Mix. (A_3B + AB) + AB		
97.0E		64

1539.—(*Continued*)

°C t_L	°C t_S	Mol % A
AB + AB_2		
104.0U		60.3
AB_2		
124.0	104.0	55
136.0	104.0	50
166.0		40
185.0		**33.3**
197.0	194.0	20
205.5	203.0	10
B		
214.0		0

1540. [369]
B = $C_{10}H_5N_3O_6$
1, 4, 5-Trinitronaphthalene

°C	Wt. % A
Mix.	
126.0	100
130.0	90
Immiscible liquids	
131.0	80
131.0	70
131.0	60
131.0	50
Mix.	
134.0	40
137.0	30
139.5	20
142.0	10
147.5	0

1541. [369]
B = $C_{10}H_6N_2O_4$
1, 5-Dinitronaphthalene

A	
126.0	100.0
A + B	
100.0E	88.5
B	
130.0	80
150.0	70
163.5	60
175.0	50
186.0	40
195.0	30
202.0	20
208.5	10
215.0	0

v. also 1879

1542. [369]
B = $C_{10}H_6N_2O_4$
1, 8-Dinitronaphthalene

A	
126.0	100
110.0	90
A + B	
88.0E	79
B	
98.5	70
109.5	60
120.0	50

1542.—(*Continued*)

°C	Wt. % A
B	
130.5	40
141.0	30
151.5	20
161.5	10
171.0	0

v. also 1536, 1878, 1879

$C_{10}H_5N_3O_6$
1, 3, 8-Trinitronaphthalene

1543. [369]
B = $C_{10}H_5N_3O_6$
1, 4, 5-Trinitronaphthalene
Mixed crystals

214.0	100
208.0	90
199	80
187.0	70
169.0	60
149.0	50
128.0	40
105.0E	29
119.0	20
134.0	10
147.5	0

Mixtures containing from 50 to 21 Mol % A freeze completely at 105.0°

1544. [369]
B = $C_{10}H_6N_2O_4$
1, 5-Dinitronaphthalene
Mix.

214.0	100
178.0	90
167.0	80
165.0†	73
174.0	60
184.0	50
193.5	40
201.5	30
207.5	20
211.5	10
215.0	0

v. also 1880

1545. [369]
B = $C_{10}H_6N_2O_4$
1, 8-Dinitronaphthalene
Mix.

214.0	100
195.5	90
178.0	80
163.0	70
148.0	60
136.0	50
135.0†	42
140.0	30
150.0	20

1545.—(*Continued*)

°C	Wt. % A
Mix.	
160.0	10
171.0	0

v. also 1537, 1539, 1878, 1880

$C_{10}H_5N_3O_6$
1, 4, 5-Trinitronaphthalene
v. 1538, 1540, 1543

2, 4, 6-Trinitronaphthalene
v. 1268.4

$C_{10}H_6N_2O_4$
1, 5-Dinitronaphthalene

1546. [369]
B = $C_{10}H_6N_2O_4$
1, 8-Dinitronaphthalene
Mix.

215.0	100
205.5	90
200.5	80
195.0	70
188.5	60
180.0	50
166.5	40
150.5	30
145.5†	22
159.5	10
171.0	0

v. also 1879, 1880, 1881

1547. [369]
B = $C_{10}H_7NO_2$
α-Nitronaphthalene
Mixed crystals

215.0	100
207.0	90
198.5	80
190.0	70
180.0	60
168.0	50
150.0	40
130.0	30
105.0	20
54.5E	9
57.0	0

Mixtures containing from 50 to 0 Wt. % A freeze completely at 54.5°

v. also 1541, 1544, 1879, 1880, 1881

$C_{10}H_6N_2O_4$
1, 8-Dinitronaphthalene

1548. [369]
B = $C_{10}H_7NO_2$
α-Nitronaphthalene

1548.—(*Continued*)

°C	Wt. % A
A	
171.0	100
159.0	90
144.0	80
128.0	70
110.5	60
94.5	50
80.0	40
65.0	30
50.0	20
A + B	
44.5E	16
B	
49.0	10
57.0	0

v. also 1542, 1545, 1546, 1879, 1880, 1881

$C_{10}H_7Br$
α-Bromonaphthalene, *v.* 607, 638

$C_{10}H_7Br$
β-Bromonaphthalene, *v.* 608, 639

$C_{10}H_7Cl$
α-Chloronaphthalene, *v.* 609, 640

$C_{10}H_7Cl$
β-Chloronaphthalene, *v.* 610

$C_{10}H_7NO_2$
α-Nitronaphthalene

1549. *v.* p. 180
B = $C_{10}H_8$
Naphthalene

1550. *v.* p. 180
B = $C_{10}H_9N$
α-Naphthylamine

1551. *v.* p. 180
B = $C_{10}H_{16}O$
Camphor

1552. [15]
B = $C_{12}H_{11}N$
Diphenylamine

A	
55.1	100.0
50.1	90.9
32.2	66.67
A + B	
23.3E	50.0
B	
28.2	33.3
40.2	20.0
46.4	9.1
50.9	0.0

v. also 398, 611, 641, 1095, 1122, 1148, 1547, 1548, 1866, 1881

$C_{10}H_8$
Naphthalene

1553. *v.* p. 180
B = $C_{10}H_8O$
α-Naphthol

1554. [82, 337, 406, 467]
B = $C_{10}H_8O$
β-Naphthol

°C t_L	°C t_S	Wt. % A
Mix.		
80.0		100
82.0	80.0	95
84.1	80.0	90
88.3	81.0	80
92.5	82.5	70
96.7	84.0	60
100.9	87.0	50
105.2	93.0	40
109.5	98.0	30
113.7	104.0	20
118.0	111.0	10
120.0	115.5	5
122.0		0

1555. [15, 406, 467]
B = $C_{10}H_9N$
α-Naphthylamine

°C	Wt. % A
A	
80.0	100
75.0	90
69.0	80
65.5	70
58.0	60
54.0	50
46.0	40
A + B	
28.0E	27
B	
35.0	20
41.5	10
49.0	0

1556. [406, 467]
B = $C_{10}H_9N$
β-Naphthylamine

°C t_L	°C t_S	Wt. % A
Mix.		
80.0		100
76.0	74.5	90
75.0	72.5	80
72.5†	72.0†	70
76.5	73.0	60
82.0	74.0	50
85.5	77.0	40
91.5	87.0	30
96.0	92.0	20
103.5	100.0	10
111.0		0

1557. [288]
B = $C_{10}H_{10}$
Dihydronaphthalene

°C	Mol % A
Mix.	
79.33	100
74.5	90
69.5	80
63.7	70
57.5	60
50.6	50
43.0	40
35.2	30
27.0	20

1558. [401]
B = $C_{10}H_{14}O$
Thymol

°C	Wt. % A
A	
80.0	100
75.4	90
70.5	80
65.4	70
59.7	60
53.3	50
44.8	40
A + B	
30.0E	28.7
B	
36.7	20
43.5	10
49.2	0

1559. [15, 406]
B = $C_{10}H_{15}BrO$
Bromocamphor

A	
80.0	100
77.0	90
73.5	80
67.5	70
61.0	60
53.0	50
A + B	
41.0E	37
B	
47.0	30
56.0	20
66.5	10
76.0	0

1560. *v.* p. 180
B = $C_{10}H_{16}$
Camphene

1561. *v.* p. 180
B = $C_{10}H_{16}O$
Camphor

1562. [413]
B = $C_{10}H_{20}O$
Menthol

°C	Mol % A
A	
80.1	100
75.1	90
70.6	80
66.4	70

$C_{10}H_8$.—(Continued)

1562.—(Continued)

°C	Mol % A
A	
62.2	60
57.7	50
52.6	40
44.8	30
A + B	
31.7E	17
B	
35.5	10
42.0	0

1563. *v.* p. 180
B = $C_{12}H_{10}$
Diphenyl

1564. *v.* p. 180
B = $C_{12}H_{11}N$
Diphenylamine

1565. (413)
B = $C_{12}H_{18}O_8$
Diethyl diacetyl-tartrate

A	
80.1	100
A + B	
43.0E	50.0
B	
67.0	0

1566. *v.* p. 180
B = $C_{13}H_{10}$
Fluorene

1567. *v.* p. 180
B = $C_{13}H_{12}$
Diphenylmethane

1568. (339, 406, 467)
B = $C_{14}H_{10}$
Anthracene

°C	Wt. % A
A	
80.0	100
A + B	
77.0E	90
B	
102.0	80
124.0	70
143.0	60
155.0	50
168.0	40
178.0	30
192.0	20
198.0	10
213.0	0

1569. (339, 406, 467)
B = $C_{14}H_{10}$
Phenanthrene

A	
80.0	100
75.0	90
70.0	80
65.0	70
57.0	60

1569.—(Continued)

°C	Wt. % A
A + B	
48.5E	54
B	
54.0	40
64.5	30
74.5	20
85.0	10
95.0	0

1570. (80)
B = $C_{18}H_{36}O_2$
Stearic acid

1571. (467)
B = $C_{19}H_{16}$
Triphenylmethane

°C	Mol % A
A	
80	100
68	80
59	66.67
B	
53	50
61	33.33
90	0

1572. (251)
B = $C_{19}H_{16}O$
Triphenyl carbinol

°C	Wt. % A
A	
80.3	100
A + B	
69.2E	70
B	
159.2	0

1573. (360)
B = $C_{32}H_{64}O_2$
Cetyl palmitate

A	
79.3	100
75.7	80.0
70.4	66.67
62.8	50.0
49.2	33.3
39.8	25.0
A + B	
36.6E	22.2
B	
38.4	16.66
39.3	14.48
43.9	0.0

1574. (360)
B = $C_{57}H_{110}O_6$
Tristearin

A	
79.3	100
71.8	66.67
64.3	50.0
50.9	33.0
A + B	
46.3E	25.0
B	
48.2	20.0
54.8	0.0

v. also 11, 27, 51, 98, 111, 209, 226, 237, 252, 258, 283, 348, 380, 388, 415, 465.1, 465.2, 468, 470.1, 490, 503, 516, 523.2, 527, 568, 612, 642, 695, 699, 719, 744, 762, 782, 799, 807, 827, 861, 884, 936, 1005, 1034, 1067, 1096, 1123, 1149, 1271, 1316, 1331, 1352, 1401, 1443, 1446, 1475, 1492, 1528, 1549

$C_{10}H_8N_2$
γ-γ-Dipyridyl
v. 569

$C_{10}H_8N_2O_2$
Furfuralazine

1575. (368)
B = $C_{10}H_8N_2S_2$
Thiophenalazine

°C	Wt. % A
Mixed crystals	
113.0	100
90.5E	68
156.0	0

Mixtures containing 87 to 25 Wt. % A freeze completely at 90.5°

1576. (368)
B = $C_{14}H_{12}N_2$
Benzalazine

Mixed crystals	
113.0	100
72.8E	36
92.0	0

Mixtures containing 70 to 18 Wt. % A freeze completely at 72.8°

$C_{10}H_8N_2S_2$
Thiophenalazine
v. 1575

$C_{10}H_8O$
α-Naphthol

1577. *v.* p. 180
B = $C_{10}H_8O$
β-Naphthol

1578. (264, 467)
B = $C_{10}H_9N$
α-Naphthylamine

A	
92.0	100
88.0	90
82.8	80
75.8	70
67.6	60
58.0	50
47.5	40

1578.—(Continued)

°C	Wt. % A
A + AB_4	
40.5E	34
AB_4	
43.0	**20**
AB_4 + B	
42.0E	13
B	
48.0	0

1579. (264, 467)
B = $C_{10}H_9N$
β-Naphthylamine

A	
92.0	100
86.8	90
79.2	80
69.7	70
A + B	
47.0E	56.5
B	
57.0	50
71.7	40
84.0	30
93.8	20
101.8	10
109.0	0

1580. (234)
B = $C_{10}H_{16}O$
Fenchone

A	
95.0	100
A + AB	
55.0E	62
AB	
60.5	**48.5**
AB + B	
1.0E	7
B	
5.3	0

1581. (36)
B = $C_{10}H_{18}O$
Cineole

A	
93.5	100
A + AB	
60.0E	62.5
AB	
+75.0	**48.3**
AB + B	
− 6.0E	4
B	
+ 1.0	0

1582. (238)
B = $C_{11}H_{12}N_2O$
Antipyrine

A	
92.7	100
No solid phase	
59.3 to 51.0	78.1 to 42.6
AB_2 + B	
73E	**27**
B	
109.9	0

1583. *v.* p. 180
B = $C_{12}H_9N$
Carbazole

1583.1. (274.2)
B = $C_{12}H_{10}N_2$
Azobenzene

°C	Wt. % A
A	
95.5	100
A + B	
48.0E	33.5
B	
67	0

1584. (261, 467)
B = $C_{12}H_{11}N$
Diphenylamine

A	
92.0	100
A + B	
38.5E	24
B	
52.0	0

1585. (262)
B = $C_{13}H_9N$
Acridine

A	
93.1	100
87.5	90
78.5	80
A + AB	
73.0E	77
AB	
85.5	70
104.0	60
113.5	50
115.5	**44.5**
113.5	40
102.5	30
AB + AB_2	
97.0U	27
AB_2	
96.0	20
AB_2 + B	
94.0E	11
B	
101.5	5
106.5	0

1586. (274)
B = $C_{13}H_{10}O$
Benzophenone

A	
93.0	100
A + AB	
37.1E	51
AB	
38.0	**44.1**
AB + B	
26.0E	25
B	
47.0	0

1587. (235)
B = $C_{13}H_{12}$
Diphenylmethane

1587.—(Continued)

°C	Wt. % A
A	
93.1	100
A + B	
19.6E	7.5
B	
23.9	0

1587.1. (234.1)
B = $C_{13}H_{12}O$
Benzhydrol

A	
95.0	100
A + B	
18.0E	35
B	
64.5	0

1588. (254)
B = $C_{19}H_{16}$
Triphenylmethane

A	
93.0	100
A + B	
63.0E	30
B	
91.0	0

1589. (271)
B = $C_{19}H_{16}O$
Triphenyl carbinol

A	
92.5	100
A + B	
60.2E	62
B	
159.2	0

v. also 158, 210, 227, 307, 449, 458.9, 459.9, 491, 1204, 1220, 1226, 1231, 1244, 1257, 1387, 1429, 1466, 1476, 1507, 1530.1, 1553, 1860

$C_{10}H_8O$
β-Naphthol

1590. (264, 467)
B = $C_{10}H_9N$
α-Naphthylamine

A	
122.0	100
111.5	90
100.3	80
88.5	70
76.0	60
A + A_2B_3	
56.2E	49
A_2B_3	
66	**40.1**
61.0	30
48.0	20
A_2B_3 + B	
36.0E	11
B	
48.0	0

1591. (264, 467)
B = $C_{10}H_9N$
β-Naphthylamine

°C	Wt. % A
A	
122.0	100
A + A_2B	
115.0E	91
A_2B	
108.8	80
120.3	*ca.* **70**
119.6	60
118.1	50
115.3	40
112.0	30
108.0	20
A_2B + B	
104.0E	11.5
B	
109.0	0

1592. (234)
B = $C_{10}H_{16}O$
Fenchone

°C	Wt. % A
A	
121.0	100
A + AB	
+23.0U	44
AB + B	
− 9.8E	19
B	
+ 5.3	0

1593. (36)
B = $C_{10}H_{18}O$
Cineole

°C	Wt. % A
A	
122.0	100
A + AB	
43.5E	52.5
AB	
+48.0	**48.3**
AB + B	
− 3.5E	8
B	
+ 1.0	0

1594. (238)
B = $C_{11}H_{12}N_2O$
Antipyrine

°C	Wt. % A
A	
122.0	100
No solid phase	
70 to 73	72.6 to 50.5
AB	
79.5	**43.3**
AB + B	
72.0E	30
B	
109.8	0

1595. *v.* p. 180
B = $C_{12}H_9N$
Carbazole

1595.1. (274.2)
B = $C_{12}H_{10}N_2$
Azobenzene

1595.1.—(*Cont'd*)

°C	Wt. % A
A	
121.0	100
A + B	
51.0E	18.0
B	
67	0

1596. (261, 467)
B = $C_{12}H_{11}N$
Diphenylamine

°C	Wt. % A
A	
122.0	100
A + B	
43.8E	16.5
B	
52.0	0

1597. (262)
B = $C_{13}H_9N$
Acridine

°C	Wt. % A
A	
121.0	100
113.5	90
A + A_3B_2	
110.0E	85
A_3B_2	
115.0	80
126.5	70
134.0	60
135.5	**54.6**
134.0	50
124.0	40
107.0	30
A_3B_2 + AB_2	
96.0U	25
AB_2	
95.0	20
AB_2 + B	
92.0E	13.5
B	
96.0	10
102.0	5
106.5	0

1598. (274)
B = $C_{13}H_{10}O$
Benzophenone

°C	Wt. % A
A	
121.9	100
A + B	
19.0E	30
B	
47.0	0

1599. (34, 38)
B = $C_{13}H_{10}O_3$
Salol

1599.—(*Continued*)

°C	Mol % A
A	
124.5	100
120	97.0
110	81.8
100	67.3
90	55.0
80	45.0
70	37.6
60	30.0
50	23.2
40	16.5
A + B	
34.5E	13.0
B	
42.5	0.0

v. also 1877

1600. (235)
B = $C_{13}H_{12}$
Diphenylmethane

°C	Wt. % A
A	
122.0	100
A + B	
22.6E	5
B	
23.8	0

1600.1. (234.1)
B = $C_{13}H_{12}O$
Benzhydrol

°C	Mol % A
A	
121.0	100
A + A_2B_3	
61.0E	37.5
A_2B_3	
62.0	34.3
A_2B_3 + B	
47.0E	20
B	
64.5	0

1601. *v.* p. 180
B = $C_{14}H_{10}$
Anthracene

1602. (254)
B = $C_{19}H_{16}$
Triphenylmethane

°C	Wt. % A
A	
121.0	100
A + B	
77.0E	20
B	
91.0	0

1603. (271)
B = $C_{19}H_{16}O$
Triphenyl carbinol

°C	Wt. % A
A	
121.5	100
A + B	
86.0E	50
B	
159.2	0

v. also 159, 211, 228, 253, 308, 450, 458.91, 459.91, 492, 614, 808, 1006, 1124, 1205, 1221, 1227, 1232, 1245, 1258, 1388, 1430, 1467, 1477, 1488, 1508, 1530.2, 1554, 1577, 1860, 1877

$C_{10}H_8O_2$
1, 4-Dihydroxy-naphthalene

1604. (240)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Wt. % A
A	
183.0	100
A + AB	
129.0E	61.0
AB	
143	**52.8**
AB + B	
44.0E	6
B	
48.3	0

1605. (240)
B = $C_{10}H_9N$
β-Naphthylamine

°C	Wt. % A
A	
183.0	100
A + AB	
125.0E	64
AB	
143	**52.8**
AB + B	
96.0E	24
B	
111.0	0

v. also 451, 1233, 1246, 1431

$C_{10}H_8O_2$
1, 5-Dihydroxy-naphthalene

1606. (240)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Wt. % A
A	
250.0	100
A + B	
44.0E	5
B	
48.3	0

1607. (240)
B = $C_{10}H_9N$
β-Naphthylamine

°C	Wt. % A
A	
250.0	100
A + AB	
212.0E	65
AB	
229.5	**52.8**
AB + B	
107.0E	5
B	
111.0	0

v. also 1432

$C_{10}H_8O_2$
1, 6-Dihydroxy-naphthalene

1608. (240)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Wt. % A
A	
134.0	100
A + A_2B_3	
76.0E	47
A_2B_3	
84.5	**42.8**
A_2B_3 + B	
43.0E	7.5
B	
48.5	0

1609. (240)
B = $C_{10}H_9N$
β-Naphthylamine

°C	Wt. % A
A	
133.0	100
A + A_2B_3	
92.0E	58
A_2B_3	
110.5	**42.8**
A_2B_3 + B	
96.0E	35
B	
111.0	0

v. also 452, 1235, 1247, 1259, 1433

$C_{10}H_8O_2$
1, 8-Dihydroxy-naphthalene

1610. (240)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Wt. % A
A	
137.0	100
A + AB	
74.0E	55
AB	
76.5	**52.8**
AB + B	
41.0E	16
B	
48.3	0

1611. (240)
B = $C_{10}H_9N$
β-Naphthylamine

°C	Wt. % A
A	
137.0	100
A + AB	
75.0E	62
AB	
124.0	**52.8**
AB + B	
76.0E	45
B	
111.0	0

v. also 1236, 1248, 1260, 1434

$C_{10}H_8O_2$
2, 3-Dihydroxy-naphthalene

1612. (240)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Wt. % A
A	
162.0	100
A + A_2B_3	
97.0E	45.5
A_2B_3	
103.0	**42.8**
A_2B_3 + B	
35.0E	13
B	
48.3	0

1613. (240)
B = $C_{10}H_9N$
β-Naphthylamine

°C	Wt. % A
A	
162.0	100
A + AB	
145.0E	76
AB	
168.0	**52.8**
AB + B	
106.5E	3
B	
111.0	0

v. also 453, 1237, 1249, 1261, 1435

$C_{10}H_8O_2$
2, 6-Dihydroxy-naphthalene

1614. (240)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Wt. % A
A	
216.0	100
A + B	
46.0E	2
B	
48.3	0

1615. (240)
B = $C_{10}H_9N$
β-Naphthylamine

°C	Wt. % A
A	
216.0	100
A + AB_2	
165.0E	59
AB_2	
171.5	**35.8**
AB_2 + B	
109.0E	2
B	
111.0	0

v. also 454, 1238, 1250, 1262, 1436

$C_{10}H_8O_2$
2, 7-Dihydroxynaphthalene

1616. (240)
B = $C_{10}H_9N$
α-Naphthylamine

°C	Wt. % A
A	
186.0	100
A + B	
35.0E	9
B	
48.3	0

1617. (240)
B = $C_{10}H_9N$
β-Naphthylamine

°C	Wt. % A
A	
186.0	100
A + AB	
155.0E	64
AB	
163.0	**52.8**
AB + B	
108.0E	1.5
B	
111.0	0

v. also 1239, 1251, 1263, 1437

$C_{10}H_9BrO_4$
Diacetylbromohydroquinol

1618. (288)
B = $C_{10}H_9ClO_4$
Diacetylchlorohydroquinol

°C	Mol % A
Mix.	
70.3	100
62.0†	46
68.46	0

$C_{10}H_9N$
α-Naphthylamine

1619. (467)
B = $C_{12}H_{11}N$
Diphenylamine

°C	Mol % A
A	
50.0	100
A + B	
18E(?)	50
B	
54.0	0

1620. (260)
B = $C_{13}H_{10}O$
Benzophenone

°C	Wt. % A
A	
+47.7	100
A + B	
− 2.0E	43
B	
+47 0	0

1621. (235)
B = $C_{13}H_{12}$
Diphenylmethane

°C	Wt. % A
A	
47.1	100
A + B	
9.5E	37
B	
24.0	0

1621.1. (234.1)
B = $C_{13}H_{12}O$
Benzhydrol

A	
49.0	100
A + B	
16.0E	62.5
B	
64.5	0

1622. (467)
B = $C_{14}H_{10}$
Anthracene

1623. (254)
B = $C_{19}H_{16}$
Triphenylmethane

A	
48.5	100
A + B	
37.0E	67
B	
91.0	0

1624. (271)
B = $C_{19}H_{16}O$
Triphenyl carbinol

A	
48.1	100
A + A_6B	
37.0E	95
A_6B	
41.5	**76.7**
A_6B + B	
38.0E	66
B	
159.2	0

v. also 51.1, 348.1, 493, 545, 570, 720, 745, 763, 783, 809, 827.1, 885, 911, 937, 1006.1, 1068, 1097, 1125, 1150, 1174, 1222, 1353, 1364, 1371, 1378, 1402, 1468, 1478, 1521, 1550, 1555, 1578, 1590, 1604, 1606, 1608, 1610, 1612, 1614, 1616, 1860

$C_{10}H_9N$
β-Naphthylamine

1625. *v.* p. 180
B = $C_{10}H_{16}O$
Camphor

1626. (260)
B = $C_{13}H_{10}O$
Benzophenone

°C	Wt. % A
A	
109.0	100
A + B	
34.5E	23
B	
47.0	0

1627. (235)
B = $C_{13}H_{12}$
Diphenylmethane

A	
109.0	100
A + B	
21.4E	5
B	
23.9	0

1627.1. (234.1)
B = $C_{13}H_{12}O$
Benzhydrol

A	
110.0	100
A + B	
51.0E	21.0
B	
64.5	0

1628. *v.* p. 180
B = $C_{14}H_{10}$
Anthracene

1629. (254)
B = $C_{19}H_{16}$
Triphenylmethane

A	
108.5	100
A + B	
72.0E	25
B	
91.0	0

1630. (271)
B = $C_{19}H_{16}O$
Triphenyl carbinol

A	
109.0	100
A + A_2B	
91.8E	62
A_2B	
92.0	**52.4**
A_2B + B	
91.8E	42
B	
159.2	0

v. also 98.1, 283.1, 470.2, 494, 571, 721, 746, 764, 784, 827.2, 886, 912, 938, 1006.2, 1069, 1098, 1126, 1151, 1175, 1205.1, 1223, 1354, 1365, 1372, 1379, 1403, 1479, 1522, 1556, 1579, 1591, 1605, 1607, 1609, 1611, 1613, 1615, 1617, 1860

$C_{10}H_9NO_4$
d-5-Nitrohydrindene-2-carboxylic acid

1631. (338)
B = $C_{10}H_9NO_4$
l-5-Nitrohydrindene-2-carboxylic acid

°C	Mol % A
A	
116.0	100
A + AB	
107.5E	88.3
AB	
122.0	**50**
AB + B	
107.5E	11.7
B	
116.0	0

$C_{10}H_{10}$
Dihydronaphthalene
v. 1557

$C_{10}H_{10}O_2$
Methyl cinnamate
v. 160, 212

$C_{10}H_{10}O_3$
p-Methoxycinnamic acid

1632. (217)
B = $C_{14}H_{14}N_2O_3$
p-Azoxyanisole

°C Liquid crystals	°C Solid phase	Mol % A
A		
185.5	170.6	100
180.5	164.0	90
174.0	158.0	80
167.0	151.0	70
160.0	143.5	60
153.0	136.0	50
146.5	127.0	40
139.5	117.0	30
A + B		
	107.6E	22
B		
133.5	108.3	20
130.5†	111.6	10
135.2	114.0	0

1633. (390)
B = $C_{16}H_{18}N_2O_3$
p-Azoxyphenetole

Liquid crystals t_L	Liquid crystals t_S	Solid phase	Mol % A
A			
188.3	188.3	173.8	100
184.0	182.5	167.5	90
179.0	176.5	161.0	80
173.5	171.0	155.0	70
169.0	166.5	148.0	60
165.0	163.0	140.8	50
162.0	160.0	132.5	40

1633.—(*Continued*)

°C Liquid crystals t_L	°C Liquid crystals t_S	°C Solid phase	Mol % A
A + B			
		125.2E	33
B			
159.5	158.5	127.0	30
158.1	158.0	132.0	20
158.0†	158.0†		18
160.0	159.0	136.0	10
167.25	167.25	138.4	0

v. also 1152

$C_{10}H_{10}O_4$
Dimethyl terephthalate, *v.* 161

$C_{10}H_{12}O$
Anethole

1634. (413)
B = $C_{10}H_{20}O$
Menthol

°C	Mol % A
A	
21.3	100
17.5	90
15.5	80
14.3	70
A + B	
13.9E	65
B	
15.1	60
20.1	50
23.6	40
27.3	30
31.6	20
36.7	10
42.0	0

$C_{10}H_{14}N_2$
Nicotine, *v.* 1007

$C_{10}H_{14}N_2O$
Nitrosodiethylaniline

1635. (195)
B = $C_{10}H_{14}N_2O_2$
Nitrodiethylaniline

Mix.	
82.2	100
73.0	0

$C_{10}H_{14}O$
Thymol

1636. (36)
B = $C_{10}H_{18}O$
Cineole

°C	Wt. % A
A	
+50.0	100
A + AB	
− 6.0E	62.5
AB	
+ 4.5	**49.3**
AB + B	
−17.5E	27.0
B	
+ 1.0	0

1637. (379)
B = $C_{13}H_{10}O$
Benzophenone

1638. (34)
B = $C_{13}H_{10}O_3$
Salol

°C	Wt. % A
A	
51.0	100
46.0	90
40.0	80
34.5	70
29.0	60
23.0	50
17.5	40
A + B	
13.0E	34
B	
26.0	20
34.0	10
42.0	0

v. also 11.1, 162, 213, 229, 284, 468.1, 495, 615, 1070, 1420, 1558

$C_{10}H_{14}O_8$
Dimethyl *d*-diacetyltartrate

1639. (1)
B = $C_{10}H_{14}O_8$
Dimethyl *l*-diacetyltartrate

A	
104.3	100
102.1	95
99.8	90
95.2	80
90.2	70
A + AB	
83.0E	57.5
AB	
83.8	**50**
AB + B	
83.0E	42.5
B	
90.2	30
95.2	20
99.8	10
102.1	5
104.3	0

$C_{10}H_{15}BrO$
d-Bromocamphor

1640. (358)
B = $C_{10}H_{15}BrO$
l-Bromocamphor

°C Stable form	°C Labile form	Mol % A
A		
75.0	45.0	100
72.6	45.5	95
70.0	46.0	90
64.1	47.2	80
57.5	48.2	70

1640.—(*Continued*)

°C	Mol % A
A + AB	
49.5E	59
AB	
50.5	**50**
AB + B	
49.5E	41
B	
57.5	30
64.1	20
70.0	10
72.6	5
75.0	0

1641. (351.5)
B = $C_{10}H_{16}O$
Camphor

°C	Wt. % A
A	
74.8	100
70.8	95
66.4	90
A + B	
62.3E	85
B	
67.0	80
80.0	70
95.5	60
111.8	50
127.2	40
141.0	30
153.0	20
164.5	10
175.4	0

1642. (34)
B = $C_{13}H_{10}O_3$
Salol

A	
76.0	100
A + B	
21.0E	40
B	
42.0	0

1643. (15)
B = $C_{57}H_{110}O_6$
Tristearin

A	
76.00	100.0
70.28	89.3
62.96	66.67
55.30	50.0
A + B	
48.7E	33.33
B	
49.88	25.0
52.90	7.7
54.80	0.0

v. also 349, 1559, 1640

$C_{10}H_{15}NO_2S$
1-Methyl-2-sulfone-amide-4-isopropyl-benzene

1644. *v.* p. 180
B = $C_{10}H_{15}NO_2S$
1-Methyl-3-sulfone-amide-4-isopropyl-benzene

$C_{10}H_{16}$
Camphene

1645. (6)
B = $C_{10}H_{16}$
Dipentene

°C	Mol % A
A	
49.0	100
+ 22.0	90
− 3.0	80
− 38.0	70
− 51.0	60
− 74.0	50
−100.0	40
A + B	
−115.0E	35
B	
−111.0	30
−104.0	20
− 96.0	10
− 89.0	0

1646. (6)
B = $C_{10}H_{16}$
α-Pinene

A	
49.0	100
34.0	90
+ 17.0	80
− 1.0	70
− 20.0	60
− 41.0	50
− 67.0	40
A + B	
−125.0E	29
B	
−108.0	20
− 99.0	10
− 72.0	0

1647. (6)
B = $C_{10}H_{16}$
β-Pinene

A	
49.0	100
34.0	90
+ 17.0	80
− 1.0	70
− 20.0	60
− 44.0	50
− 73.0	40
A + B	
−115.0E	29
B	
− 95.0	20
− 75.0	10
− 57.0	0

1648. (6)
B = $C_{10}H_{16}$
Turpentine

1648.—(*Continued*)

°C	Mol % A
A	
49.0	100
30.0	90
+ 10.0	80
− 9.0	70
− 29.0	60
− 51.0	50
− 75.0	40
A + B	
−101.0E	30
B	
− 85.0	20
− 68.0	10
− 52.0	0

1649. (99)
B = $C_{10}H_{16}O$
Camphor
Mix.

49.3	100
59.4	90
70.9	80
83.0	70
95.4	60
108.9	50
122.0	40
135.8	30
149.3	20
163.6	10
178.0	0

1650. (99)
B = $C_{10}H_{17}Cl$
Pinene hydrochloride
Mix.

49.3	100
52.8	90
56.4	80
60.0	70
64.0	60
69.3	50
78.0	40
88.4	30
99.8	20
111.8	10
123.0	0

1651. (99)
B = $C_{10}H_{18}O$
Borneol
Mix.

49.3	100
61.3	90
76.0	80
92.3	70
110.0	60
128.7	50
145.0	40
161.0	30
177.7	20
194.0	10
207.0	0

1652. (281)
B = $C_{14}H_{10}$
Phenanthrene

1652.—(*Continued*)

°C	Mol % A
A	
49.3	100
A + B	
13.5E	90.16
B	
99.0	0

v. also 238, 1008, 1560

$C_{10}H_{16}$
Dipentene
v. 1645

$C_{10}H_{16}$
α-Pinene
v. 1646

$C_{10}H_{16}$
β-Pinene
v. 1647

$C_{10}H_{16}$
Turpentine
v. 1648

$C_{10}H_{16}O$
Camphor

1653. (99)
B = $C_{10}H_{17}Cl$
Pinene hydrochloride
Mix.

178.0	100
167.5	90
159.9	80
152.1	70
147.2	60
141.1	50
135.8	40
131.3	30
128.2	20
125.5	10
123.0	0

1654. (99)
B = $C_{10}H_{18}O$
Borneol
Mix.

178.0	100
180.1	90
183.0	80
185.9	70
188.7	60
191.4	50
194.3	40
197.1	30
200.0	20
203.2	10
207.0	0

1655. (379)
B = $C_{10}H_{20}O$
Menthol

A	
175	100
155	92.64
142	88.54

1655.—(*Continued*)

°C	Mol % A
A	
108	76.73
96	70.35
48	56.08
34.5	50.54
19	46.54
B	
22.5	25.43
34.5	13.71
39.6	5.56
43.0	0

1656. (34)
B = $C_{13}H_{10}O_3$
Salol

°C	Wt. % A
A	
178.0	100
A + B	
6.0E	44
B	
42.0	0

1657. (101)
B = $C_{13}H_{12}N_2S$
Thiocarbanilide

°C	Mol % A
A	
178.0	100
A + B	
94.4E	74.5
B	
150.2	0

1658. (101)
B = $C_{14}H_{10}$
Anthracene

A	
178.0	100
A + B	
116.5E	80.5
B	
213.0	0

v. also 51.2, 214, 239, 309, 349.1, 381.1, 572, 616, 643, 683, 690, 696, 747, 785, 798, 887, 913, 939, 951, 952, 953, 1008.1, 1030, 1035, 1037, 1071, 1099, 1127, 1153, 1176, 1317, 1404, 1410, 1480, 1493, 1531, 1551, 1561, 1625, 1641, 1649

$C_{10}H_{16}O$
Fenchone
v. 617, 786, 888, 940, 1072, 1100, 1128, 1154, 1177, 1580, 1592

$C_{10}H_{16}O_4$
d-Camphoric acid

1659. (72)
B = $C_{10}H_{16}O_4$
l-Camphoric acid

°C	Mol % A
A	
171.8	100
169.7	95
A + AB	
167.5E	90
AB	
177.0	80
184.3	70
188.2	60
189.8	**50**
188.2	40
184.3	30
177.0	20
AB + B	
167.5E	10
B	
169.7	5
171.8	0

v. also 99, 350, 416

$C_{10}H_{16}O_4$
d-Isocamphoric acid

1660. (72)
B = $C_{10}H_{16}O_4$
l-Isocamphoric acid

A	
171.8	100
169.7	95
A + AB	
167.5E	90
AB	
177.0	80
184.3	70
188.2	60
189.8	**50**
188.2	40
184.3	30
177.0	20
AB + B	
167.5E	10
B	
169.7	5
171.8	0

$C_{10}H_{17}Cl$
Pinene hydrochloride

1661. (99)
B = $C_{10}H_{18}O$
Borneol
Mix.

123.0	100
127.0	90
132.5	80
139.3	70
147.0	60
155.2	50
163.9	40
172.5	30
182.0	20

$C_{10}H_{17}Cl$.—(*Continued*)

1661.—(*Continued*)

°C	Mol % A
Mix.	
192.8	10
207.0	0

v. also 1650, 1653

$C_{10}H_{17}NO$
d-Camphoroxime

1662. (1)
B = $C_{10}H_{17}NO$
l-Camphoroxime

Mix.	
118.8	100–0

$C_{10}H_{18}O$
Borneol

v. 1651, 1654, 1661

$C_{10}H_{18}O$
Cineole

1663. (36)
B = $C_{13}H_{10}O_3$
Salol

°C	Wt. % A
A	
+ 1.0	100
A + B	
−13.0E	68
B	
+42.0	0

1664. (36)
B = $C_{17}H_{12}O_3$
Naphthyl salicylate

A	
+ 1.0	100
A + B	
− 5.0E	81.5
B	
+90.0	0

v. also 889, 914, 941, 1073, 1101, 1129, 1155, 1214, 1224, 1411, 1414, 1416, 1469, 1511, 1581, 1593, 1636

$C_{10}H_{18}O$
Menthone

1665. (462)
B = $C_{10}H_{20}O$
Menthol

Mix.	
− 6.6	100
−12.0†	75
+39.0	0

$C_{10}H_{20}O$
Menthol

1666. (34)
B = $C_{13}H_{10}O_3$
Salol

1666.—(*Continued*)

°C	Wt. % A
Mix.	
41.9	100
35.0	90
32.5	80
30.0	70
28.5	60
28.0†	55
28.0	40
28.5	30
30.5	20
34.5	10
42.0	0

v. also 234, 254, 470.05, 862, 1009, 1481, 1562, 1634, 1655, 1665

$C_{11}H_{12}N_2O$
Antipyrine

1667. (34)
B = $C_{13}H_{10}O_3$
Salol

A	
112.6	100
104.5	90
98.0	80
91.0	70
83.0	60
75.0	50
65.0	40
53.0	30
A + B	
30.0E	17
B	
35.0	10
42.0	0

v. also 235, 787, 890, 915, 942, 1074, 1102, 1130, 1156, 1178, 1405, 1412, 1513, 1524, 1582, 1594

$C_{11}H_{13}NO_4$
d-Benzylamino-succinic acid

1668. (72)
B = $C_{11}H_{13}NO_4$
l-Benzylamino-succinic acid

A	
130.0	100
127.7	95
125.4	90
A + AB	
123.0E	85
AB	
124.6	80
127.5	70
129.8	60
131.0	**50**
129.8	40
127.5	30
124.6	20

1668.—(*Continued*)

°C	Wt. % A
AB + B	
123.0E	15
B	
125.4	10
127.7	5
130.0	0

$C_{12}H_4N_6O_{12}S$
Picryl sulfide

v. 1318, 1330

$C_{12}H_5N_7O_{12}$
Hexanitrodi-phenylamine

v. 1319

$C_{12}H_8$
Acenaphthylene

v. 528, 618

$C_{12}H_9Br$
Bromo-acenaphthene

1669. (83)
B = $C_{12}H_9Cl$
Chloro-acenaphthene

°C	Mol % A
Mix.	
51.2	100
52.7	90
54.5	80
56.3	70
58.2	60
59.9	50
61.8	40
63.8	30
65.7	20
67.7	10
69.8	0

1670. (83)
B = $C_{12}H_9I$
Iodo-acenaphthene

A	
51.2	100
47.4	90
43.3	80
39.1	70
34.8	60
A + B	
32.5E	55.1
B	
35.9	50
42.1	40
47.4	30
52.4	20
57.2	10
62.0	0

1671. *v.* p. 180
B = $C_{12}H_{10}$
Acenaphthene

$C_{12}H_9Cl$
Chloro-acenaphthene

1672. *v.* p. 180
B = $C_{12}H_9I$
Iodo-acenaphthene

1673. *v.* p. 180
B = $C_{12}H_{10}$
Acenaphthene

v. also 1669

$C_{12}H_9I$
Iodo-acenaphthene

1674. *v.* p. 180
B = $C_{12}H_{10}$
Acenaphthene

v. also 1670, 1672

$C_{12}H_9N$
Carbazole

1675. (370)
B = $C_{13}H_9N$
Acridine

°C t_L	°C t_S	Wt. % A
244.5		100
237.0	234.0	90
229.0	222.0	80
220.0	208.0	70
207.0	189.0	60
192.0	167.0	50
172.0	142.0	40
146.0	123.0	30
108.0†		9
110.2		0

1676. (122, 370, 475)
B = $C_{14}H_{10}$
Anthracene

t_L	t_S	Wt. % A
245.6		100
Mixed crystals		
242.5	241.5	95
239.6	237.5	90
234.0	231.0	80
229.2	225.0	70
225.0	223.0	60
223U		54
221.2	220.3	40
219.5	219.4	30
218.0	218.0	20
216.5	216.5	10
216.0	216.0	5
216.5		0

v. also 1882, 1883

1677. (122, 370, 475)
B = $C_{14}H_{10}$
Phenanthrene

t_L	t_S	Wt. % A
245.6		100
Mixed crystals		
242.0	233.0	95
238.0	218.0	90
230.0	180.0	80
221.0	119.2	70
211.5	119.2	60
201.0	119.2	50
188.2	119.2	40
173.0	119.2	30

1677.—(*Continued*)

°C t_L	°C t_S	Wt. % A
Mixed crystals		
151.5	119.2	20
119.2U		10
108.0	101.2	5
98.8		0

v. also 1882

1678. *v.* p. 180
B = $C_{18}H_{12}$
Chrysene

v. also 1883

1679. (370)
B = $C_{18}H_{18}$
Retene

°C	Wt. % A
A	
244.5	100
239.0	90
233.0	80
226.0	70
217.0	60
208.0	50
196.0	40
182.0	30
165.0	20
135.0	10
A + B	
86.0E	*ca.* 3
B	
98.0	0

v. also 12, 28, 184, 285, 351, 381, 517, 573, 619, 722, 748, 765, 788, 828, 863, 891, 916, 943, 1010, 1103, 1130.1, 1157, 1179, 1206, 1320, 1355, 1447, 1583, 1595, 1882, 1883

$C_{12}H_9NO_2$
Nitroacenaphthene

v. 620, 644

$C_{12}H_{10}$
Acenaphthene

1680. *v.* p. 180
B = $C_{13}H_{10}$
Fluorene

1681. (379)
B = $C_{14}H_{10}O_2$
Benzil

°C	Mol % A
A	
95	100
A + B	
68.8E	46.42
B	
98.5	0

1682. (133)
B = $C_{17}H_{14}O$
Cinnamylidene-acetophenone

°C	Wt. % A
A	
92.5	100
A + B	
67.0E	43
B	
100.0	0

v. also 13, 29, 52, 100, 352, 382, 417, 471, 518, 529, 574, 621, 645, 723, 749, 766, 789, 800, 810, 829, 864, 892, 917, 944, 1207, 1301, 1321, 1356, 1366, 1373, 1380, 1448, 1496, 1512, 1529, 1671, 1673, 1674

$C_{12}H_{10}$
Diphenyl

v. 622, 646, 1011, 1285, 1563

$C_{12}H_{10}N_2$
Azobenzene

1686. *v.* p. 180
B = $C_{12}H_{10}N_2O$
Azoxybenzene

1687. *v.* p. 180
B = $C_{12}H_{12}N_2$
Hydrazobenzene

1688. (29, 373)
B = $C_{13}H_{11}N$
Benzalaniline

Mixed crystals	
68.5	100
38.2E	22.5
49.5	0

Mixtures containing from 35 to 13 Wt. % A freeze completely at 38.2°

1689. (189, 373)
B = $C_{13}H_{13}N$
Benzylaniline

Mixed crystals	
68.5	100
25.0E	23
36.5	0

Mixtures containing from 45 to 5 Wt. % A freeze completely at 25.0°

1690. (372)
B = $C_{14}H_{10}$
Tolane

Mix.	
68.5	100
56.8†	42
62.5	0

1691. (463)
B = $C_{14}H_{10}O_2$
Benzil

°C	Mol % A
Mixed crystals	
66.2	100
51.0E	60.7
92.7	0

Mixtures containing from 57 to 42 Mol % A freeze completely at 51.0°

1692. (123, 372)
B = $C_{14}H_{12}$
Stilbene

°C	% A
Mix.	
68.5	100
124.0	0

1693. (463)
B = $C_{14}H_{12}O_2$
Benzoin

°C	Mol % A
Mixed crystals	
66.2	100
63.8E	94.3
133.0	0

Mixtures containing 100 to 50 Mol % A freeze completely at 63.8°

1694. (29, 123, 372)
B = $C_{14}H_{14}$
Dibenzyl

°C	Wt. % A
Mix.	
68.5	100
48.0†	30
52.5	0

1695. *v.* p. 181
B = $C_{14}H_{14}N_2$
p-Azotoluene

1696. (374)
B = $C_{16}H_{12}N_2$
Benzeneazonaphthalene

Mixed crystals	
68.5	100
59.7E	72.5
131.0	0

Mixtures containing from 87 to 39 Wt. % A freeze completely at 59.7°

1697. (374)
B = $C_{16}H_{16}O_2$
p-Dimethoxystilbene

A	
68.5	100
A + B	
67.5E	98.8
B	
212.0	0

1698. (133)
B = $C_{17}H_{14}O$
Cinnamylideneacetophenone

°C	Wt. % A
A	
67.0	100
A + B	
55.0E	64
B	
100.0	0

1699. (374)
B = $C_{20}H_{14}N_2$
Azonaphthalene

Mixed crystals	
68.5	100
67.3E	87.5
186.6	0

Mixtures containing 100 to 75 Wt. % A freeze completely at 67.3°

v. also 101, 353, 418, 622.1, 789.1, 892.1, 917.1, 944.1, 1103.1, 1130.2, 1157.1, 1179.1, 1583.1, 1595.1

$C_{12}H_{10}N_2O$
Azoxybenzene
v. 1686

$C_{12}H_{10}O$
Diphenyl ether

1700. (365)
B = $C_{12}H_{10}S$
Diphenyl sulfide

°C	Wt. % A
Mixed crystals	
+26.0	100
−27.5E	13.3
−21.5	0

Mixtures containing from 47 to 4.5 Wt. % A freeze completely at −27.5°

v. also 575

$C_{12}H_{10}O_2$
α-Naphthyl acetate
v. 163

$C_{12}H_{10}O_2$
β-Naphthyl acetate
v. 164

$C_{12}H_{10}S$
Diphenyl sulfide

1701. (365)
B = $C_{12}H_{10}Se$
Diphenyl selenide

°C	Wt. % A
Mix.	
−21.0	100
−26.7†	95
+ 2.5	0

1702. (365)
B = $C_{12}H_{10}Te$
Diphenyl telluride

°C	Wt. % A
Mix.	
−21.0	100
−30.7†	83.5
+ 4.0	0

v. also 1700

$C_{12}H_{10}Se$
Diphenyl selenide

1703. (365)
B = $C_{12}H_{10}Te$
Diphenyl telluride

Mix.	
+2.5	100
−4.2†	80.4
+4.0	0

v. also 1701

$C_{12}H_{10}Te$
Diphenyl telluride
v. 1702, 1703

$C_{12}H_{11}N$
Diphenylamine

1704. (138)
B = $C_{13}H_{10}O$
Benzophenone

°C	Wt. % A
A	
53.1	100
A + AB	
28.7E	63.5
AB	
30.85	**48.1**
AB + B	
24.0E	28
B	
47.75	0

1705. (467)
B = $C_{14}H_{10}$
Anthracene

°C	Mol % A
A	
54	100.0
B	
147	66.7
165	50.0
180	33.3
213	0.0

1706. (42)
B = $C_{14}H_{13}NO$
Acetyldiphenylamine

A	
52.7	100
A + B	
14.3E	62.5
B	
99.8	0

1707. (138)
B = $C_{16}H_{34}O$
n-Cetyl alcohol

1707.—(*Continued*)

°C	Wt. % A
A	
53.1	100
A + B	
38.0E	24.5
B	
46.3	0

1708. (136)
B = $C_{17}H_{14}O$
Cinnamylideneacetophenone

A	
52.5	100
A + B	
36.0E	*ca.* 59
B	
100.0	0

Author's belief in existence of compound probably due to supercooling

v. also 255, 399, 623, 700, 750, 790, 811, 842, 893, 918, 945, 1012, 1075, 1104, 1131, 1158, 1180, 1322, 1357, 1406, 1444, 1445, 1482, 1552, 1564, 1584, 1596, 1619

$C_{12}H_{11}N_3$
Aminoazobenzene

1709. (374)
B = $C_{14}H_{12}$
Stilbene

°C	Wt. % A
Mixed crystals	
142.0	100
96.0E	62.5
124.0	0

Mixtures containing from 74 to 40 Wt. % A freeze completely at 96.0°

$C_{12}H_{11}N_3$
p-Aminoazobenzene
v. 1323

$C_{12}H_{12}N_2$
Hydrazobenzene

1710. (373)
B = $C_{13}H_{11}N$
Benzalaniline

°C	Wt. % A
Mixed crystals	
130.5	100
34.2E	15
49.5	0

Mixtures containing from 47 to 8 Wt. % A freeze completely at 34.2°

1711. (373)
B = $C_{13}H_{13}N$
Benzylaniline

°C	Wt. % A
Mixed crystals	
130.5	100
33.0E	19
36.0	0

Mixtures containing from 50 to 6 Wt. % A freeze completely at 33.0°

1713. (372)
B = $C_{14}H_{10}$
Tolane

Mix.	
130.5	100
49.8†	17.5
62.5	0

1714. (372)
B = $C_{14}H_{12}$
Stilbene

Mix.	
130.5	100
93.0†	52.25
123.5	0

1715. (463)
B = $C_{14}H_{12}O_2$
Benzoin

°C	Mol % A
Mixed crystals	
127.2	100
98.4E	55.4
133.0	0

Mixtures containing from 80 to 20 Mol % A freeze completely at 98.4°

1716. (372)
B = $C_{14}H_{14}$
Dibenzyl

°C	Wt. % A
Mix.	
130.5	100
45.9†	13.8
52.5	0

v. also 1013, 1687

$C_{12}H_{12}O$
β-Naphthol ethyl ether

1717. (133)
B = $C_{17}H_{14}O$
Cinnamylideneacetophenone

A	
36.0	100
A + B	
29.5E	76
B	
100.0	0

$C_{12}H_{16}O_3$
Isobutyl *d*-mandelate

1718. (72)
B = $C_{12}H_{16}O_3$
Isobutyl *l*-mandelate

°C	Wt. % A
A	
35.3	100
33.0	95
A + AB	
31.0E	90.5
AB	
35.4	80
37.2	70
38.2	60
38.7	**50**
38.2	40
37.2	30
35.4	20
AB + B	
31.0E	9.5
B	
33.0	5
35.3	0

$C_{12}H_{18}O_8$
Diethyl diacetyltartrate, *v.* 256, 865, 1076, 1442, 1565

$C_{12}H_{24}O_2$
Lauric acid

1719. (152)
B = $C_{14}H_{28}O_2$
Myristic acid

A	
43.6	100
41.3	90
38.5	80
35.2	70
A + B	
32.0E	60
B	
37.4	50
43.0	40
46.7	30
49.6	20
51.8	10
53.8	0

1720. (152, 472)
B = $C_{16}H_{32}O_2$
Palmitic acid

A	
43.6	100
41.5	90
37.0	80
A + B	
34.5E	75
B	
38.3	70
43.4	60
47.0	50
51.0	40
54.5	30
57.4	20
59.8	10
62.0	0

$C_{12}H_{24}O_2$.—(*Continued*)

1721. (152)
B = $C_{18}H_{36}O_2$
Stearic acid

°C	Wt. % A
A	
43.6	100
41.5	90
A + B	
37.0E	77
B	
43.4	70
50.8	60
55.8	50
59.0	40
62.0	30
64.7	20
67.0	10
69.2	0

v. also 102, 354, 419, 473

$C_{13}H_8N_2O_7$
Di-(*o*-nitrophenyl) carbonate

1722. (159)
B = $C_{13}H_8N_2O_7$
Di-(*o*, *p'*-Nitrophenyl) carbonate

°C	% A
A	
112.6	100
110.0	94.0
100.0	73.6
A + B	
94.6E	64.7
B	
100.0	57.8
110.0	43.6
120.0	25.0
130.1	0.0

v. also 1884

1723. (159)
B = $C_{13}H_8N_2O_7$
Di-(*p*-nitrophenyl) carbonate

°C	% A
A	
112.6	100
110.0	94.0
100.0	73.6
A + B	
95.4E	65.8
B	
100.0	61.1
110.0	50.7
120.0	37.0
130.0	21.0
140.0	3.9
142.2	0.0

v. also 1884

$C_{13}H_8N_2O_7$
Di-(*o*-, *p'*-Nitrophenyl) carbonate

1724. (159)
B = $C_{13}H_8N_2O_7$
Di-(*p*-nitrophenyl) carbonate

°C	% A
A	
130.1	100
120.0	75.0
110.0	56.4
A + B	
107.5E	52.5
B	
110.0	49.2
120.0	36.5
130.0	21.0
140.0	3.9
142.2	0.0

v. also 1722, 1884

$C_{13}H_8N_2O_7$
Di-(*p*-nitrophenyl) carbonate
v. 1723, 1724, 1884

$C_{13}H_8O$
Fluorenone
v. 576

$C_{13}H_8O_2$
Xanthone
v. 577

$C_{13}H_9N$
Acridine

1726. (370)
B = $C_{14}H_{10}$
Anthracene

°C Mix. t_L	t_S	Wt. % A
110.2	110.2	100
109.5†	109.5†	92.3
138.0	109.5	80
156.0	131.0	70
170.0	149.0	60
181.0	164.0	50
191.0	177.0	40
199.0	188.0	30
206.0	199.0	20
209.0	203.0	10
216.5	216.5	0

1727. (370)
B = $C_{14}H_{10}$
Phenanthrene

Mix.		
110.2	110.2	100
103.0		90
94.0		80
85.0		70
76.0		60
66.5†	66.5	50
71.0	66.5	40
79.5	74.5	30
86.5	83.5	20
93.0	91.5	10
98.8		0

1728. (370)
B = $C_{14}H_{11}N$
Methylacridine

°C	Wt. % A
Mixed crystals	
110.2	100
100.0	90
88.0	80
72.0	70
53U	*ca.* 55
72.0	25
76.0	20
83.0	10
90.5	0

v. also 1077, 1105, 1133, 1159, 1523, 1585, 1597, 1675

$C_{13}H_{10}$
Fluorene
v. 14, 103, 286, 355, 383, 519, 530, 578, 624, 647, 724, 751, 767, 791, 801, 812, 830, 866, 1014, 1208, 1324, 1358, 1367, 1374, 1381, 1449, 1516, 1530, 1566, 1680

$C_{13}H_{10}ClNO$
o-Chlorobenzanilide

1729. (215)
B = $C_{13}H_{10}ClNO$
p-Chlorobenzanilide

°C	Mol % A
A	
106.0	100
A + B	
91.5E	90
B	
190.0	0

$C_{13}H_{10}O$
Benzophenone

1730. (217)
B = $C_{14}H_{14}N_2O_3$
p-Azoxyanisole

°C Liquid crystals	°C Solid phase	Mol % A
	A	
	47.7	100
	A + B	
	42.2E	93
	B	
	47.0	90
	62.5	80
	83.0	60
	95.5	40
	106.3	20
	110.4	10
115.5	Trp.	7
122.0	112.7	4
135.0	114.0	0

v. also 104, 165, 625, 792, 894, 919, 946, 1078, 1106, 1134, 1160, 1181, 1483, 1586, 1598, 1620, 1626, 1637, 1704

$C_{13}H_{10}O_2$
Phenyl benzoate
v. 166

$C_{13}H_{10}O_3$
Salol

1731. *v.* p. 181
B = $C_{17}H_{12}O_3$
Betol

v. also 215, 230, 236, 400, 1470, 1489, 1599, 1638, 1642, 1656, 1663, 1666, 1667, 1877

$C_{13}H_{11}N$
Benzalaniline

1732. (463)
B = $C_{13}H_{11}NO$
Benzanilide

°C	Mol % A
Mixed crystals	
49.8	100
48.0E	97
160.8	0

Mixtures containing from 100 to 40 Mol % A freeze completely at 48.0°

1733. (375)
B = $C_{13}H_{13}N$
Benzylaniline

°C	Wt. % A
Mixed crystals	
49.5	100
10.0E	36.5
36.0	0

Mixtures containing from 53 to 29 Wt. % A freeze completely at 10.0°

1734. (373)
B = $C_{14}H_{10}$
Tolane

Mixed crystals	
49.5	100
36.0E	72
62.5	0

Mixtures containing from 89 to 45 Wt. % A freeze completely at 36.0°

1735. (373)
B = $C_{14}H_{12}$
Stilbene

Mixed crystals	
49.5	100
45.0E	92
123.5	0

Mixtures containing from 95 to 64.5 Wt. % A freeze completely at 45°

1736. (463)
B = $C_{14}H_{12}O_2$
Benzoin

°C	Mol % A
Mixed crystals	
49.8	100
47.0E	94.7
133.0	0

Mixtures containing from 100 to 35 Mol % A freeze completely at 47.0°

1737. (363)
B = $C_{14}H_{13}NO$
Anisylideneaniline

°C	Wt. % A
A	
49.0	100
A + A_2B	
27.5E	70
A_2B	
33.5	**41**
A_2B + B	
25.5E	40
B	
57.0	0

1738. (373)
B = $C_{14}H_{14}$
Dibenzyl

Mixed crystals	
49.5	100
30.2E	72
52.5	0

Mixtures containing from 80 to 37 Wt. % A freeze completely at 30.2°

v. also 1688, 1710

$C_{13}H_{11}NO$
Benzanilide

1739. (463)
B = $C_{14}H_{10}O_2$
Benzil

°C	Mol % A
Mixed crystals	
160.8	100
87.4E	14.5
93.6	0

Mixtures containing from 65 to 5 Mol % A freeze completely at 87.4°

1740. (463)
B = $C_{14}H_{12}O_2$
Benzoin

Mixed crystals	
160.8	100
116.6E	36
133.0	0

Mixtures containing from 60 to 20 Mol % A freeze completely at 116.6°

v. also 1732

$C_{13}H_{12}$
Diphenylmethane
v. 626, 648, 920, 947, 1079, 1107, 1135, 1161, 1182, 1264, 1286, 1567, 1587, 1600, 1621, 1627

$C_{13}H_{12}N_2S$
Thiocarbanilide
v. 1657

$C_{13}H_{12}O$
Benzylphenol

1741. (373)
B = $C_{13}H_{13}N$
Benzylaniline

°C	Wt. % A
Mixed crystals	
38.5	100
17.0E	44.5
36.0	0

Mixtures containing from 60 to 32 Wt. % A freeze completely at 17.0°

1742. (373)
B = $C_{14}H_{14}$
Dibenzyl

Mixed crystals	
38.5	100
23.8E	70
52.5	0

Mixtures containing from 72.5 to 33 Wt. % A freeze completely at 23.8°

$C_{13}H_{12}O$
Benzhydrol
v. 626.1, 792.1, 894.1, 920.1, 947.1, 1015, 1080, 1107.1, 1135.1, 1161.1, 1182.1, 1239.1, 1264.1, 1525, 1587.1, 1600.1, 1621.1, 1627.1

$C_{13}H_{13}N$
Benzylaniline

1743. (373)
B = $C_{14}H_{10}$
Tolane

°C	Wt. % A
Mixed crystals	
36.0	100
27.0E	62
62.5	0

Mixtures containing from 91 to 25 Wt. % A freeze completely at 27.0°

1744. [373]
B = $C_{14}H_{12}$
Stilbene

°C	Wt. % A
Mixed crystals	
36.0	100
32.0E	95
123.5	0

Mixtures containing from 97.5 to 39 Wt. % A freeze completely at 32.0°

1745. [463]
B = $C_{14}H_{12}O_2$
Benzoin

°C	Mol % A
Mixed crystals	
34.2	100
32.4E	97.8
132.7	0

Mixtures containing from 100 to 30 Mol % A freeze completely at 32.4°

1746. [373]
B = $C_{14}H_{14}$
Dibenzyl

°C	Wt. % A
Mixed crystals	
36.0	100
19.0E	67.5
52.5	0

Mixtures containing from 76.5 to 47.5 Wt. % A freeze completely at 19.0°

v. also 1689, 1711, 1733, 1741

$C_{13}H_{13}N$
Diphenylmethylamine
v. 839, 1081

$C_{13}H_{10}O_3$
Phenyl salicylate
v. 167

$C_{13}H_{13}O_3P$
Methyldiphenoxyphosphine oxide

1747. [371]
B = $C_{18}H_{15}O_4P$
Triphenyl phosphate

°C	Wt. % A
A	
36.0	100
A + B	
22.5E	59
B	
49.0	0

$C_{14}H_8O_2$
Anthraquinone
v. 53, 105, 185, 287, 356, 384, 504, 520, 867, 1016, 1209, 1450

$C_{14}H_{10}$
Anthracene

1748. [122, 370, 475]
B = $C_{14}H_{10}$
Phenanthrene

°C Mix. t_L	°C Mix. t_S	Wt. % A
216.5		100
212.5	209.0	95
209.3	200.0	90
202.0	182.0	80
194.0	165.0	70
185.0	150.0	60
175.0	135.0	50
163.0	125.0	40
148.5	115.0	30
131.0	107.0	20
110.0	102.0	10
103.0	100.5	5
98.8	98.8	0

v. also 1882

1749. [370]
B = $C_{14}H_{11}N$
Methylacridine

°C	Wt. % A
A	
216.5	100
212.0	90
207.0	80
201.0	70
194.0	60
186.0	50
173.0	40
155.0	30
130.0	20
84.0E	*ca.* 8
90.5	0

1750. *v.* p. 181
B = $C_{18}H_{12}$
Chrysene
v. also 1883

1751. [370]
B = $C_{18}H_{18}$
Retene

°C t_L	°C t_S	Wt. % A
216.5		100
212.0	211.0	90
207.0	205.0	80
200.0	196.0	70
192.0	182.0	60
182.0	147.0	50
170.0	88.5	40
153.0	88.5	30
130.0	88.5	20
88.5E		8.5
93.0	88.5	5
98.0	98.0	0

v. also 15, 30, 106, 186, 288, 357, 385, 469, 521, 531, 579, 627, 649, 725, 752, 768, 793, 802, 813, 831, 868, 895, 921, 948, 1017, 1136, 1210, 1325, 1359, 1368, 1375, 1382, 1451, 1484, 1568, 1601, 1622, 1628, 1658, 1676, 1705, 1726, 1860, 1882, 1883

$C_{14}H_{10}$
Phenanthrene

1752. [370]
B = $C_{18}H_{12}$
Chrysene

°C t_L	°C t_S	Wt. % A
98.8		100
98.0	95.5	95
95.5†		87
114.0	95.5	80
142.0	121.0	70
166.0	151.0	60
185.0	175.0	50
202.0	195.0	40
217.0	211.0	30
230.5	227.0	20
242.0	240.0	10
252.5		0

1753. [370]
B = $C_{18}H_{18}$
Retene

°C Mix. t_L	°C Mix. t_S	Wt. % A
98.8	98.8	100
92.0	90.0	90
83.5	81.0	80
73.0	69.0	70
61.0	58.0	60
	56.5†	46
59.0	57.0	40
65.5	57.0	30
79.0	68.0	20
90.0	84.0	10
98.0		0

v. also 16, 31, 54, 107, 112, 187, 289, 358, 386, 470, 505, 522, 532, 580, 628, 650, 726, 753, 769, 794, 803, 814, 832, 868.1, 1018, 1211, 1326, 1360, 1369, 1376, 1452, 1569, 1652, 1677, 1727, 1748, 1882

$C_{14}H_{10}$
Tolane

1754. [372]
B = $C_{14}H_{12}$
Stilbene

1754.—(*Continued*)

°C Mix. t_L	°C Mix. t_S	Wt. % A
62.5		100
74.3	65.0	90
83.2	70.2	80
97.0	81.4	60
108.6	94.5	40
117.3	107.7	20
123.5		0

1755. [372]
B = $C_{14}H_{14}$
Dibenzyl

Mix.		
62.5		100
61.3	56.5	90
59.7	54.4	80
56.9	52.7	60
55.0	52.6	40
53.7	52.5	20
52.5		0

v. also 1690, 1713, 1734, 1743

$C_{14}H_{10}O_2$
Benzil

1756. [463]
B = $C_{14}H_{12}$
Stilbene

°C	Mol % A
Mixed crystals	
94.0	100
87.3	90
81.2	80
76.6E	71.5
85.5	60
93.0	50
100.0	40
106.0	30
111.2	20
116.0	10
120.4	0

Mixtures containing from 88 to 40 Mol % A freeze completely at 76.6°

1757. *v.* p. 181
B = $C_{14}H_{12}O_2$
Benzoin

1758. [463]
B = $C_{14}H_{14}$
Dibenzyl

°C	Mol % B
92.7	0
88.0	10
83.0	20
77.7	30
71.6	40
63.6	50
53.7	60
42.4	70
44.6	80
48.1	90
51.2	100

1759. [463]
B = $C_{14}H_{14}O_2$
Hydrobenzoin

°C	Mol % A
Mixed crystals	
93.5	100
89.2	90
85.8E	82
95.4	70
103.0	60
109.8	50
115.2	40
120.1	30
124.8	20
129.6	10
133.7	0

Mixtures containing from 95 to 33 Mol % A freeze completely at 85.8°

v. also 168, 216, 358.1, 1018.1, 1407, 1681, 1691, 1739

$C_{14}H_{10}O_3$
Benzoic anhydride
v. 310, 1438

$C_{14}H_{11}N$
Methylacridine
v. 1728, 1749

$C_{14}H_{12}$
Stilbene

1760. [372]
B = $C_{14}H_{14}$
Dibenzyl

°C Mix. t_L	°C Mix. t_S	Wt. % A
123.5	123.5	100
121.0	114.5	90
117.0	105.0	80
113.0	96.0	70
108.0	87.0	60
102.0	80.0	50
95.0	73.0	40
85.5	66.0	30
75.0	59.5	20
64.0	54.5	10
52.5		0

1761. [374]
B = $C_{14}H_{14}N_2$
Azotoluene

°C	Wt. % A
Mix.	
124.0	100
100.0†	56
144.0	0

1762. [374]
B = $C_{16}H_{16}O_2$
p-Dimethoxystilbene

1762.—(*Continued*)

°C	Wt. % A
Mix.	
124.0	100
116.5†	94
212.0	0

1763. [374]
B = $C_{20}H_{14}N_2$
Azonaphthalene

Mixed crystals	
123.5	100
112.5E	70.5
186.6	0

Mixtures containing from 85 to 64 Wt. % A freeze completely at 112.5°

v. also 629, 651, 1692, 1709, 1714, 1735, 1744, 1754, 1756

$C_{14}H_{12}N_2$
Benzalazine

1764. [368]
B = $C_{14}H_{16}N_2$
Dibenzylhydrazine

Mix.	
92.0	100
38.0†	16
47.0	0

1765. [368]
B = $C_{15}H_{13}N$
Cinnamylideneaniline

Mix.	
92.0	100
84.0†	70
107.5	0

1766. [368]
B = $C_{16}H_{10}$
Diphenyldiacetylene

Mix.	
92.0	100
77.0†	23.5
88.0	0

1767. [368]
B = $C_{16}H_{14}$
Diphenylbutadiene

Mix.	
92	100
148.4	0

1768. [368]
B = $C_{22}H_{16}N_2$
α-Naphtholazine

Mixed crystals	
92.0	100
80.0E	68
152.0	0

Mixtures containing from 79 to 44 Wt. % A freeze completely at 80.0°

v. also 1576

$C_{14}H_{12}O_2$
Benzoin

1769. (463)
B = $C_{14}H_{14}$
Dibenzyl

°C	Mol % A
Mixed crystals	
133.0	100
127.5	90
124.0	80
121.0	70
117.0	60
114.0	50
110.0	40
104.0	30
91.5	20
72.0	10
50.2E	4
51.2	0

Mixtures containing from 60 to 0 Mol % A freeze completely at 50.2°

v. also 1693, 1715, 1736, 1740, 1745, 1757

$C_{14}H_{12}O_2$
Phenyl anisyl ketone
v. 169

$C_{14}H_{12}O_2$
Benzyl benzoate
v. 170

$C_{14}H_{13}NO$
Acetyl-diphenylamine
v. 1706

$C_{14}H_{13}NO$
Anisylideneaniline
v. 1737

$C_{14}H_{13}N_5O_4$
m-Nitrobenzene-diazoethylamino-*p*-nitrobenzene

1770. (431)
B = $C_{14}H_{13}N_5O_4$
p-Nitrobenzene-diazoethylamino-*m*-nitrobenzene

°C	% A
Mix.	
178.5	100
170.5	90
163.3	80
158.0	70
155.9†	58
156.7	50
160.3	40
166.6	30
174.0	20
182.3	10
193.0	0

$C_{14}H_{14}$
Dibenzyl
v. 630, 652, 1694, 1716, 1738, 1742, 1746, 1755, 1758, 1760, 1769

$C_{14}H_{14}N_2$
Azotoluene
v. 1695, 1761

$C_{14}H_{14}N_2O_2$
p-Azoanisole

1771. (45)
B = $C_{14}H_{14}N_2O_3$
p-Azoxyanisole

°C Liquid crystals	°C Solid phase	Mol % A
	A	
	164.6	100
	160.2	90
	155.9	80
	151.2	70
	145.7	60
	139.2	50
124.4	131.6	40
126.0	Trp.	33.5
127.0	122.8	30
	A + B	
129.8	113.0E	20
	B	
132.4	115.4	10
134.8	117.4	0

1772. (45)
B = $C_{15}H_{16}N_2O_2$
p-Azoanisole-phenetole

°C Liquid crystals	°C Solid phase	Mol % A
	Mix.	
	164.6	100
	159.0	90
	154.0	80
	148.8	70
	143.6	60
	139.0	50
124.0	135.0	40
126.0	133.0	30
	132.7†	25
128.1	132.8	20
130.1	133.5	10
132.2	134.5	0

1773. (45)
B = $C_{16}H_{18}N_2O_2$
p-Azophenetole

°C Liquid crystals	°C Solid phase	Mol % A
	A	
	164.6	100
	158.3	90
	151.9	80
	145.6	70
128.5	139.4	60
	A + B	
133.0	133.0E	50
	B	
137.1	139.5	40
141.6	145.0	30
146.1	150.2	20
150.7	155.1	10
155.0	159.5	0

1773.1. (45)
B = $C_{16}H_{18}N_2O_2$
p-Methyl-propylazophenol

°C	Mol % A
Liquid crystals	
109.9	100
109.6	90
109.1	80
109.1	70
109.2	60

$C_{14}H_{14}N_2O_3$
p-Azoxyanisole

1774. (45)
B = $C_{15}H_{16}N_2O_2$
p-Azoanisole-phenetole

°C Liquid crystals	°C Solid phase	Mol % A
	A	
134.4	117.4	100
132.6	112.4	90
131.0	107.1	80
	A + B	
	102.5E	71.5
	B	
130.0	103.5	70
129.8	109.7	60
129.7	115.4	50
129.5	120.4	40
129.7	124.5	30
130.0	128.4	20
130.8	131.8	10
132.2	134.5	0

1775. (390)
B = $C_{16}H_{18}N_2O_3$
p-Azoxyphenetole

Liquid crystals t_L	Liquid crystals t_S	Solid phase	Mol. % A
		A	
135.5		118.5	100
137.8	137.2	114.4	90
140.5	140.1	109.5	80
143.2	142.8	103.9	70
		A + B	
		97.5E	61.5
		B	
146.3	145.8	99.0	60
149.6	149.2	107.7	50
152.8	152.4	115.2	40
156.3	155.9	122.1	30
159.7	159.3	128.4	20
163.2	162.8	133.8	10
167.3		138.4	0

v. also 868.2, 1019, 1162, 1632, 1730, 1771

$C_{14}H_{14}O_2$
Hydrobenzoin
v. 1759

$C_{14}H_{16}N_2$
Hydrazotoluene
v. 1020

$C_{14}H_{16}N_2$
Dibenzylhydrazine

1776. (368)
B = $C_{15}H_{13}N$
Cinnamylidene-aniline

°C	Wt. % A
Mixed crystals	
47.0	100
35.5E	95.5
107.5	0

Mixtures containing from 98 to 59 Wt. % A freeze completely at 35.5°

1777. (368)
B = $C_{16}H_{14}$
Diphenylbutadiene

°C	Wt. % A
Mix.	
47.0	100
148.4	0

v. also 1764

$C_{14}H_{16}N_2O_2$
Hydrazoanisole
v. 1021

$C_{14}H_{28}O_2$
Myristic acid

1778. (252)
B = $C_{16}H_{32}O_2$
Palmitic acid

°C	Wt. % A
A	
53.8	100
51.8	90
49.5	80
46.4	70
A + B	
43.5E	62
B	
48.0	50
51.5	40
55.0	30
58.0	20
60.1	10
62.0	0

1779. (152)
B = $C_{18}H_{36}O_2$
Stearic acid

°C	Wt. % A
A	
53.8	100
50.7	90
47.8	80
A + B	
45.0E	73
B	
50.7	60
55.0	50
59.1	40
62.5	30
65.0	20

1779.—(*Continued*)

°C	Wt. % A
B	
67.2	10
69.2	0

v. also 108, 359, 420, 474, 1719

$C_{15}H_{13}N$
Cinnamylidene-aniline

1780. (368)
B = $C_{16}H_{10}$
Diphenyl-diacetylene

°C	Wt. % A
Mix.	
107.5	100
75.0†	19
88.0	0

1781. (368)
B = $C_{16}H_{14}$
Diphenylbutadiene

°C	Wt. % A
Mix.	
107.5	100
148.5	0

v. also 1765, 1776

$C_{15}H_{16}N_2O_2$
p-Azoanisole-phenetole

1782. (45)
B = $C_{16}H_{18}N_2O_3$
p-Azoxyphenetole

°C Liquid crystals	°C Solid phase	Mol % A
	A	
132.2	134.5	100
135.4	131.5	90
139.0	128.4	80
142.5	125.2	70
145.8	122.2	60
149.4	118.7	50
	A + B	
	118.0E	48
	B	
152.8	121.6	40
156.3	126.1	30
159.8	130.3	20
163.5	134.0	10
167.5	136.9	0

1783. (45)
B = $C_{18}H_{22}N_2O_2$
p-Dipropyl-azophenol

°C Liquid crystals	°C Solid phase	Mol % A
	A	
132.2	134.5	100
129.4	130.0	90
126.5	125.1	80
123.9	119.9	70
121.7	113.7	60
	A + B	
	113.0E	59
	B	
119.8	119.8	50
	126.5	40
	132.3	30
	137.4	20
	141.9	10
	146.1	0

v. also 1772, 1774

$C_{16}H_{10}$
Diphenyl-diacetylene

1784. (368)
B = $C_{16}H_{14}$
Diphenylbutadiene

°C	Wt. % A
Mix.	
88.0	100
148.4	0

v. also 1766, 1780

$C_{16}H_{11}N_3O_7$
Naphthalene picrate

1785. (334)
B = $C_{17}H_{13}N_3O_7$
Methylnaphthalene β-picrate

°C	Wt. % A
Mix.	
150.0	100
115.0	0

v. also 1022

$C_{16}H_{12}N_2$
Benzene-azonaphthalene
v. 1696

$C_{16}H_{14}$
Diphenylbutadiene

1786. (368)
B = $C_{19}H_{15}N$
Cinnamylidene-β-naphthylamine

°C	Wt. % A
Mixed crystals	
148.4	100
78.8E	21.5
106.0	0

Mixtures containing from 68 to 13 Wt. % A freeze completely at 78.8°

v. also 1767, 1777, 1781, 1784

$C_{16}H_{16}O_2$
p-Dimethoxy-stilbene
v. 1697, 1762

$C_{16}H_{18}N_2O_2$

p-Azophenetole

1787. ([45, 390])

B = $C_{16}H_{18}N_2O_3$

p-Azoxyphenetole

°C Liquid mixed crystals t_L	t_S	Solid mixed crystals t_L	t_S	Mol % A
A				
		162.4	162.4	100
		161.0	160.2	95
		159.8	158.2	90
		158.7	156.0	85
		157.7	154.0	80
A + B′				
157.4E		157.4E		77
B′				
157.6	157.4	157.4	152.0	75
157.9	157.4	157.4	150.0	70
159.0	158.0	154.6	147.0	60
162.0	161.0	149.2	142.5	40
164.7	164.0	143.8	139.7	20
167.3	167.3	138.4	138.4	0

B′ = Liquid crystals

1788. ([45])

B = $C_{18}H_{22}N_2O_2$

p-Dipropyl-azophenol

°C Liquid crystals	Solid phase	Mol % A
A		
156.1	160.2	100
151.4	156.0	95
147.0	151.1	90
142.5	146.5	85
138.1	142.5	80
134.0	139.5	75
129.5	138.5	70
	139.6	60
A + B		
	138.4E	41.1
B		
	143.5	20
	146.1	0

v. also 290, 1773

$C_{16}H_{18}N_2O_2$

p-Methyl-propylazophenol

1790. ([45])

B = $C_{17}H_{20}N_2O_2$

p-Ethyl-propylazophenol

°C Liquid crystals	Solid phase	Mol % A
Mix.		
109.9	113.1	100
113.1	111.0†	90
116.1	111.8	80
119.2	114.2	70
122.2	118.4	60
125.3	123.6	50
128.2	128.5	40
131.0	132.8	30
134.0	136.9	20
136.8	140.7	10
139.6	144.2	0

1791. ([45])

B = $C_{18}H_{22}N_2O_2$

p-Dipropyl-azophenol

°C	Mol % A
Liquid crystals	
109.9	100
108.9	90
108.9	80
108.9	70

v. also 1773.1

$C_{16}H_{18}N_2O_3$

p-Azoxyphenetole

1792. ([390])

B = $C_{30}H_{50}O_2$

Cholesteryl propionate

°C Liquid crystals t_L	t_S	Solid phase t_L	t_S	Mol % A
167.3	167.3	138.4	138.4	100
157.2	156.6	135.0		90
148.4	147.4	130.2	83.4	80
134.2	133.0	122.2	82.6	60
129.2	128.0	117.0	82.7	50
121.1	120.[illegible]	102.3	82.8	30
118.2	117.4	87.2	82.6	20
		82.6E		17
115.2	114.4	88.4	82.8	10
112.4		96.2		0

1793. ([390])

B = $C_{31}H_{52}O_2$

Cholesteryl isobutyrate

167.3	167.3	138.4	138.4	100
161.0	159.2	136.4	136.4	95
145.2	142.6	130.4	106.4	80
115 2	114.2	122.2	106.4	60
115.2	114.2	112.2	106.4	40
A + B		A′ + B		
		108.0E		32
110.0E				30
B				
118.0				20
124.8				10
128.8				0

A′ = Liquid crystals

1794. ([390])

B = $C_{34}H_{50}O_2$

Cholesteryl benzoate

167.3		138.4		100
162.0	161.0	134.5	112.0	90
157.1	156.0	130.0	111.5	80
156.0†	156.0†			73
157.3	157.3	121.8	112.5	60
		112.5E		46
161.8	161.2	120.0	112.0	40
169.0	167.5	136.5	111.5	20
178.8		149.5		0

v. also 1633, 1775, 1782, 1787

$C_{16}H_{32}O_2$

Palmitic acid

1795. ([69])

B = $C_{18}H_{34}O_2$

Oleic acid

1795.—(*Continued*)

°C	Wt. % A
Mix.	
62.0	100.0
60.0	91.8
58.0	85.3
56.0	74.5
54.0	65.8
52.0	57.8
50.0	51.0
47.5	43.5
45.0	36.9
40.0	27.4
35.0	20.0
30.0	14.5
25.0	10.2
20.0	6.8
15.0	3.7
9.0	0.0

v. also 1885

1796. ([69, 95.5, 152, 469])

B = $C_{18}H_{36}O_2$

Stearic acid

A	
62.0	100
60.0	92.0
58.0	83.1
56.0	74.5
A + AB	
54.9E	70.0
AB	
56.0	59.5
AB + B	
56.5U	48.0
B	
58.0	43.0
60.0	36.0
62.0	29.0
64.0	21.9
66.0	13.7
69.2	0.0

v. also 1885, 1886, 1887

1797. ([332])

B = $C_{20}H_{40}O_2$

Arachidic acid

1798. ([333])

B = $C_{24}H_{48}O_2$

Lignoceric acid

°C t_L	t_S	Wt. % A
Mix.		
62.5	62.5	100
59.0	58.0	90
56.5†	56.5†	78
57.5	57.0	70
59.5	58.5	60
63.0	61.5	50
66.0	64.5	40
68.0	67.0	30
71.0	70.0	20
74.5	73.5	10
79.5	79.5	0

1799. *v.* p. 181

B = $C_{27}H_{46}O$

Cholesterol

1800. *v.* p. 181

B = $C_{51}H_{98}O_6$

Tripalmitin

v. also 1886, 1888

1801. ([246.7])

B = $C_{57}H_{110}O_6$

Tristearin

°C	Wt. % A
A	
61.0	100
60.0	90
58.8	80
57.7	70
56.6	60
A + AB	
55.5E	50
AB	
59.0	40
62.0	30
63.5	**22.3**
AB + AB₄	
63.0E	16
AB₄	
67.7	10
68.4	**6.7**
AB₄ + B	
56E *ca.*	0.5
B	
56.0	0

v. also 109, 360, 421, 475, 1720, 1778, 1885, 1886, 1887, 1888

$C_{16}H_{34}O$

n-Cetyl alcohol

1802. ([340])

B = $C_{27}H_{46}O$

Cholesterol

°C	Mol % A
A	
50.0	100
A + AB	
45.0E	89
AB + B	
52.0U	69
B	
148.0	0

The compound AB crystallizes in liquid crystals. The eut. A + B is therefore between solid crystals A and liquid crystals AB

v. also 217, 231, 361, 1707

$C_{16}H_{37}NO_2$

Ammonium palmitate

v. 362

$C_{17}H_{12}O_3$

Betol

v. 1731

$C_{17}H_{12}O_3$

Naphthyl salicylate

v. 1664

$C_{17}H_{13}N$

Benzylidene-α-naphthylamine

1803. ([374])

B = $C_{17}H_{13}N$

Benzylidene-β-naphthylamine

°C	Mol % A
Mixed crystals	
73.0	100
47.5E	61
103.0	0

Mixtures containing from 67 to 41 Mol % A freeze completely at 47.5°

$C_{17}H_{13}N_3O_7$

Methylnaphthalene α-picrate

1804. ([334])

B = $C_{17}H_{13}N_3O_7$

Methylnaphthalene β-picrate

°C	% A
Mix.	
141.0	100
115.0	0

$C_{17}H_{13}N_3O_7$

Methylnaphthalene β-picrate

v. 1785, 1804

$C_{17}H_{14}$

α-Benzyl-naphthalene

v. 631, 653

$C_{17}H_{14}O$

Cinnamylidene-acetophenone

v. 1327, 1682, 1698, 1708, 1717

$C_{17}H_{14}O$

Dibenzylacetone

v. 171, 218

$C_{17}H_{16}O_3$

Eugenol benzoate

1805. ([348])

B = $C_{17}H_{16}O_3$

Isoeugenol benzoate

°C	Mol % A
A	
69.5	100
A + B	
56.5E	74.5
B	
104.0	0

$C_{17}H_{17}NO$

d-Benzoyltetra-hydroquinaldine

1806. ([1])

B = $C_{17}H_{17}NO$

l-Benzoyltetra-hydroquinaldine

°C	Mol % A
A	
119.4	100
119.2	95
119.0	90
118.5	80
118.0	70
A + AB	
117.8E	65
AB	
118.2	60
119.2	**50**
118.2	40
AB + B	
117.8E	36
B	
118.0	30
118.5	20
119.0	10
119.2	5
119.4	0

$C_{17}H_{20}N_2O$

Tetramethyldiami-nobenzophenone

v. 1526

$C_{17}H_{20}N_2O_2$

p-Ethylpropyl-azophenol

v. 1790

$C_{17}H_{22}N_2O$

Tetramethyl-diaminobenzhydrol

v. 1023

$C_{18}H_{12}$

Chrysene

v. 1678, 1750, 1752, 1883

$C_{18}H_{15}As$

Triphenylarsine

1807. ([367])

B = $C_{18}H_{15}Bi$

Triphenyl-bismuthine

°C	Wt. % A
Mixed crystals	
59.0	100
40.0E	72.5
76.0	0

Mixtures containing from 80 to 48 Wt. % A freeze completely at 40.0°

$C_{18}H_{15}As$.—(*Continued*)

1808. [367]
B = $C_{18}H_{15}N$
Triphenylamine

°C	Wt. % A
Mixed crystals	
59.0	100
45.5E	76
127.5	0

Mixtures containing from 85 to 56 Wt. % A freeze completely at 45.5°

1809. [367]
B = $C_{18}H_{15}P$
Triphenyl-phosphine

°C	Wt. % A
Mixed crystals	
59.0	100
64.2U	61.5
79.1	0

1810. [367]
B = $C_{18}H_{15}Sb$
Triphenylstibine

°C	Wt. % A
Mix.	
59.0	100
37.5†	30
58.0	0

$C_{18}H_{15}AsO$

Triphenylarsine oxide

1811. [371]
B = $C_{18}H_{15}AsS$
Triphenylarsine sulfide

°C	Wt. % A
Mix.	
192.0	100
116.0†	53
163.0	0

1812. [371]
B = $C_{18}H_{15}OP$
Triphenylphosphine oxide

°C	Wt. % A
Mix.	
192.0	100
153.5	0

1813. [371]
B = $C_{18}H_{15}SbS$
Triphenylstibine sulfide

°C	Wt. % A
Mixed crystals	
192.0	100
43.0E	8
119.0	0

Mixtures containing from 55 to 0 Wt. % A freeze completely at 43.0°

$C_{18}H_{15}AsS$

Triphenylarsine sulfide

1814. [371]
B = $C_{18}H_{15}OP$
Triphenyl-phosphine oxide

°C	Wt. % A
Mixed crystals	
163.0	100
115.0E	47
153.5	0

Mixtures containing 68 to 26 Wt. % A freeze completely at 115.0°

1815. [371]
B = $C_{18}H_{15}PS$
Triphenyl-phosphine sulfide

°C	Wt. % A
Mix.	
163.0	100
155.0†	26
158.0	0

1816. [371]
B = $C_{18}H_{15}SbS$
Triphenylstibine sulfide

°C	Wt. % A
Mix.	
163.0	100
97.0†	5
119.0	0

v. also 1811

$C_{18}H_{15}Bi$

Triphenyl-bismuthine

1817. [367]
B = $C_{18}H_{15}P$
Triphenyl-phosphine

°C	Wt. % A
Mixed crystals	
76.0	100
42.0E	54
79.1	0

Mixtures containing from 66 to 44 Wt. % A freeze completely at 42°

v. also 1807

$C_{18}H_{15}N$

Triphenylamine

1818. [367]
B = $C_{18}H_{15}P$
Triphenylphosphine

°C	Wt. % A
Mix.	
127.5	100
63.5†	25
79.1	0

v. also 1808

$C_{18}H_{15}OP$

Triphenylphosphine oxide

1819. [371]
B = $C_{18}H_{15}O_4P$
Triphenyl phosphate

1819.—(*Continued*)

°C	Wt. % A
Mix.	
153.5	100
47.5†	6
49.0	0

1820. [371]
B = $C_{18}H_{15}PS$
Triphenylphosphine sulfide

°C	Wt. % A
Mix.	
153.5	100
122.0†	38.5
158.0	0

1821. [371]
B = $C_{18}H_{15}SbS$
Triphenylstibine sulfide

°C	Wt. % A
Mixed crystals	
153.5	100
42E	10
119.0	0

Mixtures containing from 78 to 0 Wt. % A freeze completely at 42°

v. also 1812, 1814

$C_{18}H_{15}O_3PS$

Triphenyl thiophosphate

1822. [371]
B = $C_{18}H_{15}O_4P$
Triphenyl phosphate

°C	Wt. % A
Mix.	
63.0	100
42.0†	32
49.0	0

1823. [371]
B = $C_{18}H_{15}PS$
Triphenylphosphine sulfide

°C	Wt. % A
Mixed crystals	
63.0	100
56.0E	87
158.0	0

Mixtures containing from 50 to 5 Wt. % A freeze completely at 56.0°

$C_{18}H_{15}O_4P$

Triphenyl phosphate
v. 1747, 1819, 1822

$C_{18}H_{15}P$

Triphenylphosphine
v. 1809, 1817, 1818

$C_{18}H_{15}PS$

Triphenylphosphine sulfide

1824. [371]
B = $C_{18}H_{15}SbS$
Triphenylstibine sulfide

1824.—(*Continued*)

°C	Wt. % A
Mix.	
158.0	100
82.0†	*ca.* 6
119.0 d.	0

v. also 1272, 1815, 1820, 1823

$C_{18}H_{15}SbS$

Triphenylstibine sulfide
v. 1813, 1816, 1821, 1824

$C_{18}H_{15}Sb$

Triphenylstibine
v. 1810

$C_{18}H_{18}$

Retene
v. 533, 581, 632, 654, 804, 1328, 1679, 1751, 1753

$C_{18}H_{18}N_2O_4$

Ethyl *p*-azobenzoate

1825. [217]
B = $C_{18}H_{18}N_2O_5$
Ethyl *p*-azoxybenzoate

°C Liquid crystals		°C Solid phase	Mol % A
Mix.			
		143.1	100
		139.0	90
		133.0	80
		122.0	60
		115.5	40
	114.6 Trp.		25
	116.2	114.5	20
	119.4	114.3	10
117.8	121.0	114.2	5
122.4	122.4	114.2	0

$C_{18}H_{22}N_2O_2$

p-Dipropyl-azophenol
v. 1783, 1788, 1791

$C_{18}H_{34}O_2$

Oleic acid

1826. [69, 117, 329]
B = $C_{18}H_{36}O_2$
Stearic acid

°C	Wt. % A
A	
9.0	100.0
20.0	95.2
25.0	92.2
30.0	90.0
35.0	85.9
40.0	81.9
45.0	74.5
47.5	70.5
50.0	66.1
52.0	62.5
54.0	51.8
56.0	52.8

1826.—(*Continued*)

°C	Wt. % A
A	
58.0	46.8
60.0	40.0
62.0	32.1
64.0	23.2
66.0	14.0
69.0	0.0

v. also 1885

1827. *v.* p. 181
B = $C_{27}H_{46}O$
Cholesterol

v. also 1795, 1885

$C_{18}H_{36}O_2$

Stearic acid

1828. [332]
B = $C_{20}H_{40}O_2$
Arachidic acid

°C t_L	°C t_S	Wt. % A
Mix.		
69.0	69.0	100
67.0	66.0	90
65.0	63.5	80
63.0	61.5	70
60.5†	60.5†	63
61.5	60.5	50
63.5	62.5	40
66.0	65.0	30
69.0	68.0	20
72.0	71.5	10
75.0	75.0	0

1829. [333]
B = $C_{24}H_{48}O_2$
Lignoceric acid

°C t_L	°C t_S	Wt. % A
Mix.		
69.0	69.0	100
67.0		90
65.0		80
63.5†	63.5†	73
66.0	65.0	60
67.5	66.0	50
68.5	67.0	40
70.0	69.0	30
72.0	71.0	20
75.0	74.5	10
79.5	79.5	0

1830. *v.* p. 181
B = $C_{27}H_{46}O$
Cholesterol

1831. *v.* p. 181
B = $C_{51}H_{98}O_6$
Tripalmitin
v. also 1886, 1889

1832. [246.7]
B = $C_{57}H_{110}O_6$
Tristearin

°C	Wt. % A
A	
67.5	100
67.0	90
66.0	80

1832.—(*Continued*)

°C	Wt. % A
A	
64.5	70
62.7	60
61.1	50
59.5	40
57.8	30
56.0	20
A + B	
54.0E	10
B	
56.0	0

v. also 363, 1570, 1721, 1779, 1796, 1826, 1885, 1886, 1887, 1889

$C_{18}H_{37}NO_2$

Ammonium oleate
v. 364

$C_{18}H_{39}NO_2$

Ammonium stearate
v. 364.1

$C_{19}H_{13}N$

5-Phenylacridine
v. 633

$C_{19}H_{15}N$

Cinnamylidene-β-naphthylamine
v. 1786

$C_{19}H_{16}$

Triphenylmethane

1833. *v.* p. 181
B = $C_{19}H_{16}O$
Triphenyl carbinol

1834. [294]
B = $C_{19}H_{17}N_3$
Triphenylguanidine

°C	Wt. % A
A	
90.0	100
A + B_s	
81.0E	80
A + B_m	
78.8E	77.5
B_m	
138.0	0
B	
142.4	0

v. also 32, 430, 431, 437, 523, 634, 655, 815, 896, 922, 949, 1024, 1082, 1108, 1137, 1163, 1183, 1212, 1240, 1252, 1265, 1485, 1571, 1588, 1602, 1623, 1629

$C_{19}H_{16}O$

Triphenyl carbinol
v. 582, 635, 727, 754, 770, 816, 898, 923, 950, 1083, 1109,

1138, 1164, 1184, 1253, 1266, 1329, 1361, 1486, 1572, 1589, 1603, 1624, 1630, 1833, 1860

$C_{19}H_{17}N_3$
Triphenylguanidine
v. 311, 1495, 1834

$C_{20}H_{14}N_2$
Azonaphthalene
v. 1699, 1763

$C_{20}H_{24}N_2O_2$
Quinine, *v.* 1026

$C_{20}H_{40}O_2$
Arachidic acid

1835. (333)
B = $C_{24}H_{48}O_2$
Lignoceric acid

°C	Wt. % A
Mix.	
75.0	100
67.0†	65
80.0	0

v. also 1797, 1828

$C_{21}H_{21}N$
Tribenzylamine
v. 1421

$C_{22}H_{16}N_2$
α-Naphtholazine
v. 1768

$C_{22}H_{42}O_2$
Brassidic acid

1836. (327)
B = $C_{22}H_{42}O_2$
Erucic acid

°C	% A
A	
58.3	100
A + B	
31.7E	17.0
B	
33.3	0

1837. (327)
B = $C_{22}H_{42}O_2$
Isoerucic acid

Mixed crystals	
58.3	100
52U	45
51.5	0

1838. (327)
B = $C_{22}H_{44}O_2$
Behenic acid

Mixed crystals	
58.3	100
57.2E	91
79.2	0

$C_{22}H_{42}O_2$
Erucic acid

1839. (327)
B = $C_{22}H_{42}O_2$
Isoerucic acid

°C	Wt. % A
A	
33.3	100
A + B	
29.7	78
B	
51.2	0

1840. (327)
B = $C_{22}H_{44}O_2$
Behenic acid

A	
33.34	100
A + B	
33.1E	96
B	
79.25	0

v. also 1836

$C_{22}H_{42}O_2$
Isoerucic acid

1841. (327)
B = $C_{22}H_{44}O_2$
Behenic acid

°C	% A
Mix.	
51.5	100
79.2	0

v. also 1837, 1839

$C_{22}H_{44}O_2$
Behenic acid

1842. (333)
B = $C_{22}H_{44}O_2$
Isobehenic acid

Mix.	
84.0	100
75.0	0

v. also 1838, 1840, 1841

$C_{23}H_{46}O_2$
Methyl behenate

1843. (333)
B = $C_{23}H_{46}O_2$
Methyl isobehenate

Mix.	
55.0	100
52.5†	8
54.0	0

$C_{24}H_{47}BrO_2$
α-Bromotetracosanic acid

1844. (333)
B = $C_{24}H_{47}BrO_2$
α-Bromolignoceric acid

Mix.	
73.5	100
67.0†	10
68.5	0

$C_{24}H_{48}O_2$
Tetracosanic acid

1845. (333)
B = $C_{24}H_{48}O_2$
Lignoceric acid

°C	Mol % A
Mix.	
85.5–86	100
78.5†	10
79.5–80	0

$C_{24}H_{48}O_2$
Lignoceric acid
v. 1798, 1829, 1835, 1845

$C_{25}H_{50}O_2$
Methyl tetracosanate

1846. (333)
B = $C_{25}H_{50}O_2$
Methyl lignocerate

Mix.	
59.5–60.0	100
56.0†	15
57.0–57.5	0

$C_{27}H_{46}O$
Cholesterol
v. 1799, 1802, 1827, 1830

$C_{29}H_{48}O_2$
Cholesteryl acetate

1847. (199)
B = $C_{29}H_{48}O_2$
α-Phytosteryl acetate

Mix.	
113.6	100
128.3†	*ca.* 30
127.1	0

1848. (199)
B = $C_{29}H_{48}O_2$
β-Phytosteryl acetate

Mix.	
113.6	100
141.2	0

$C_{29}H_{48}O_2$
α-Phytosteryl acetate
v. 1847

$C_{29}H_{48}O_2$
β-Phytosteryl acetate
v. 1848

$C_{30}H_{50}O_2$
Cholesteryl propionate
v. 1792

$C_{31}H_{52}O_2$
Cholesteryl isobutyrate
v. 1793

$C_{32}H_{64}O_2$
Cetyl palmitate
v. 1573

$C_{34}H_{50}O_2$
Cholesteryl benzoate
v. 1794

$C_{51}H_{98}O_6$
Tripalmitin

1849. (261.5)
B = $C_{57}H_{104}O_6$
Triolein

°C	Wt. % A
Mix.	
62.6	100
62.0	90
60.0	64.5
58.0	52.0
56.0	43.3
54.0	36.0
52.0	30.2
50.0	26.0
45.0	18.7
40.0	14.3
30.0	8.2
20.0	4.8
+10.0	2.5
− 7.0	0.0

v. also 1890

1850. (261.5)
B = $C_{57}H_{110}O_6$
Tristearin

°C	Wt. % A
Mix.	
62.6	100
62.0	98.0
60.0	91.0
58.0	84.0
56.0	{ 75.5 40.0
58.0	26.0
60.0	{ 14.0 7.0
58.0	3.0
56.0	0.0

v. also 1800, 1831, 1886, 1888, 1889, 1890

$C_{57}H_{104}O_6$
Triolein

1851. (261.5)
B = $C_{57}H_{110}O_6$
Tristearin

Mix.	
− 7.0	100
+10.0	98.5
20.0	97.0

1851.—(*Continued*)

°C	Wt. % A
Mix.	
30.0	94.5
40.0	89.5
45.0	84.5
50.0	79.0
52.0	76.2
54.0	71.8
56.0	68.8
58.0	64.2
60.0	59.5
62.0	54.5
64.0	48.0
65.0	{ 43.0 31.0
64.0	24.0
62.0	16.0
60.0	10.0
58.0	5.0
56.0	0

v. also 1849, 1890

$C_{57}H_{110}O_6$
Tristearin
v. 1574, 1643, 1801, 1832, 1850, 1851, 1887, 1888, 1889, 1890

PART II

THREE-COMPONENT SYSTEMS

1852. C_2H_5NO, Acetamide; B = C_2H_6O, Ethyl alcohol; C = C_6H_6O, Phenol (267, 436).

Isothermal Compositions in Wt. % B

Solvent	75 % A + 25 % C	50 % A + 50 % C	40 % A + 60 % C	25 % A + 75 % C	6 % A + 94 % C
Solid phase	A	A	AC_2	AC_2	C
60 °C	3.0				
50	15.5				
40	27.0			0.7	
30	38.0	5.5	2.8	9.7	0.7
20	49.5	19.0	10.5	19.0	6.0
10	60.6	32.2	18.7	28.5	17.0

v. also 298, 323.1; Eq. 292, p. 174.

1853. $C_6H_3Cl_3$, 1, 2, 3-Trichlorobenzene; B = $C_6H_3Cl_3$, 1, 2,-4-Trichlorobenzene; C = $C_6H_3Cl_3$, 1, 3, 5-Trichlorobenzene (303).

Isothermal Compositions in % of Solid Phase

Solvent	A + B, A + C, or A + (B + C)	B + C, B + A, or B + (C + A)	C + A, C + B, or C + (A + B)
Solid phase	A	B	C
0.0 °C	27.8	64.2	24.0
10.0	37.8	84.8	31.4
20.0	49.5		40.4
30.0	62.7		51.4
40.0	77.9		64.0
50.0	95.3		78 6
60.0			95.7

−5.0°E at 23 % A, 56.5 % B, 20.5 % C.
M. P.: A, 52.4°; B, 16.6°; C, 62.7°.

1853.—(*Continued*)

Binary eutectics: A + B, 2.6° at 69.0% B.
A + C, 24.5° at 44.8% C.
B + C, 4.6° at 27.5% C.

1854. **C_6H_4BrCl,** *o*-Bromochlorobenzene; B = C_6H_4BrCl, *m*-Bromochlorobenzene; C = C_6H_4BrCl, *p*-Bromochlorobenzene ([181]).

Solvent = 86.7% A + 13.3% C	
°C	% B
−18.6E	0.0
−20.7	5.0
−23.0	10.0
−25.3	15.0
−27.7	20.0

v. also Eq. 656.

1855. **C_6H_4BrCl,** *p*-Bromochlorobenzene; B = $C_6H_4Br_2$, *p*-Dibromobenzene; C = $C_6H_4Cl_2$, *p*-Dichlorobenzene ([59, 60, 277]).

Isothermal Compositions in Mol % B

Solvent	20% A + 80% C	50% A + 50% C	80% A + 20% C
85 °C	93.2	92.6	91.5
82.5	85.2	83.1	80.5
80.0	78.2	74.8	70.0
77.5	71.0	66.0	59.5
75.0	64.3	58.0	49.0
72.5	57.2	49.5	38.5
70.0	50.5	40.8	27.7
67.5	43.7	32.0	16.7
65.0	36.8	22.2	4.4
62.5	29.2	12.4	
60.0	20.8	4.8	
57.5	13.0		
55.0	6.0		

v. also 657, 658, 675.

1856. **$C_6H_4Br_2$,** *o*-Dibromobenzene; B = $C_6H_4Br_2$, *m*-Dibromobenzene; C = $C_6H_4Br_2$, *p*-Dibromobenzene ([181]).

Solvent = 87.0% A + 13.0% C	
°C	% B
+0.3E	0.0
−1.3	5.0
−3.8	10.0
−6.7	15.0

v. also Eq. 672.

1857. **$C_6H_4Cl_2$,** *o*-Dichlorobenzene; B = $C_6H_4Cl_2$, *m*-Dichlorobenzene; C = $C_6H_4Cl_2$, *p*-Dichlorobenzene ([181]).

Solvent = 86.7% A + 13.3% C	
°C	% B
−23.4E	0.0
−25.2	5.0
−27.1	10.0
−29.1	15.0
−31.2	20.0

v. also Eq. 701.

1858. **$C_6H_4Cl_2O_4S_2$,** *m*-Benzenedisulfonyl chloride; B = $C_7H_4Cl_2O_3S$, *sym*-Chloride of *m*-sulfobenzoic acid; C = $C_7H_4Cl_2O_3S$, *sym*-Chloride of *p*-sulfobenzoic acid ([308]).

Solvent = 74% B + 26% C	
°C	% A
8.4E	0
5.0	7.1
10.0	5.6
15.0	4.0

v. also 704, Eq. 1280.

1859. **$C_6H_4Cl_2O_4S_2$,** *p*-Benzenedisulfonyl chloride. B = $C_7H_4Cl_2O_3S$, *sym*-Chloride of *m*-sulfobenzoic acid; C = $C_7H_4Cl_2O_3S$, *sym*-Chloride of *p*-sulfobenzoic acid ([308]).

Solvent = 74% B + 26% C	
°C	% A
8.4E	0.0
6.6	5.0
4.9	10.0
3.1	15.0

v. also 705, Eq. 1280.

1860. **$C_6H_4O_2$,** *p*-Quinone; **B = x; C = $C_6H_5NO_2$,** Nitrobenzene ([266]).

Where x = picric acid, dinitrophenol, *o*-, *m*-, and *p*-nitrophenol, phenol, catechol, resorcinol, quinol, pyrogallol, *p*-toluidine, α- and β-naphthol, α- and β-naphthylamine, anthracene, and triphenyl carbinol. The nitrobenzene acts only as a diluent to decrease the speed of the secondary reactions occurring between the other substances. These systems are therefore pseudobinary.

v. also 805, 806, 808, 813, 816.

1861. **$C_6H_5NO_3$,** *o*-Nitrophenol; B = $C_6H_5NO_3$, *m*-Nitrophenol; C = $C_6H_5NO_3$, *p*-Nitrophenol ([71]).

Isothermal Compositions in % of Solid Phase

Solvent	50% B + 50% C	50% A + 50% C	50% A + 50% B
Solid phase	A	B	C
110.0 °C			94.2
100.0			81.7
90.0		93.7	70.6
80.0		78.7	60.3
70.0		64.9	51.0
60.0		53.0	43.0
50.0		45.0	36.6
40.0	89.9		30.7
35.0	79.2		
30.0	68.9		

21.5°E at 57.7% A, 23.2% B, 19.1% C.

v. also Eq. 869, 870, 899.

1862. **$C_6H_6N_2O_2$,** *o*-Nitroaniline; B = $C_6H_6N_2O_2$, *m*-Nitroaniline; C = $C_6H_6N_2O_2$, *p*-Nitroaniline ([180, 236, 304, 351, 461]).

Isothermal Compositions in % of Solid Phase

Solvent	A + B, A + C, or A + (B + C)	B + C, B + A, or B + (C + A)	C + A, C + B, or C + (A + B)
Solid phase	A	B	C
140.0 °C			88.7
130.0			75.9
120.0			65.0
110.0		96.1	55.3
100.0		79.8	46.5
90.0		65.8	38.9
80.0		53.4	31.9
70.0		43.0	26.0
60.0	88.0	34.0	21.0
50.0	75.0	26.0	16.3

43.3°E at 67.0% A, 20.0% B, 13.0% C.

M. P.: A, 68.9°; B, 112.4°; C, 148.2°.

Binary eutectics: A + B, 50.0° at 25.5% B.
A + C, 55.0° at 18.6% C.
B + C, 88.0° at 37.0% C.

1863. C_6H_6O, Phenol; B = C_7H_8O, *m*-Cresol; C = C_7H_8O, *p*-Cresol (90, 118, 454).

ISOTHERMAL COMPOSITIONS IN WT. % A

Solvent	80 % B + 20 % C	50 % B + 50 % C	20 % B + 80 % C
Solid phase	A	A	A
40.0 °C	99.0	99.1	99.1
38.0	95.3	95.7	96.0
36.0	91.3	92.3	92.9
34.0	87.3	88.6	89.6
32.0	83.6	85.5	86.8
30.0	80.1	82.4	83.8
28.0	76.3	79.0	80.8
26.0	72 5	76.0	78.2
24.0	68.6	72.7	75.3
22.0	64.8	69.8	72.6
20.0	61.2	66.7	70.0
18.0		64.0	67.5
16.0		61.3	64.9
15.0			62.7

v. also 1055, 1056, 1456.

1864. $C_6H_6O_2$, Catechol; B = $C_6H_6O_2$, Resorcinol; C = $C_6H_6O_2$, Hydroquinol (195, 420).

ISOTHERMAL COMPOSITIONS IN % OF SOLID PHASE

Solvent	70 % B + 30 % C	67 % A + 33 % C	47 % A + 53 % B
Solid phase	A	B	C
160 °C			80.3
150			63.6
140			52.0
130			44.5
120			39.0
110			34.4
100	94.3	84.2	30.6
90	78.8	73.3	27.2
80	65.0	64.8	24.5
70	53.5	57.3	22.5
60	44.0	50.0	20.5
50	40.0	45.0	19.3

46.9°E at 38.0 % A, 43.0 % B, 19.0 % C.
v. also 1084, 1085, 1110.

1865. $C_6H_6O_2$, Catechol; B = $C_6H_6O_2$, Resorcinol; C = $C_{10}H_7NO_2$, α-Nitronaphthalene (420).
37.5°E at 20 Wt. % A, 15.0 % B, 65 % C.
v. also 1084, 1095, 1122.

1866. $C_6H_6O_2$, Catechol; B = $C_6H_6O_2$, Hydroquinol; C = $C_{10}H_7NO_2$, α-Nitronaphthalene (420).
48.0°E at 9.0 Wt. % A, 3.0 % B, 88.0 % C.
v. also 1085, 1095, 1148.

1867. $C_7H_4Cl_3NO_2$, *o*-Nitrophenylchloroform; B = $C_7H_4Cl_3NO_2$, *m*-Nitrophenylchloroform; C = $C_7H_4Cl_3NO_2$, *p*-Nitrophenylchloroform (173).

Solvent = 12.7 % B + 87.3 % C	
°C	% A
129.7E	0
125.1	5
120.5	10
116.0	15

v. also 1281.

1868. $C_7H_5ClO_2$, *o*-Chlorobenzoic acid; B = $C_7H_5ClO_2$, *m*-Chlorobenzoic acid; C = $C_7H_5ClO_2$, *p*-Chlorobenzoic acid (50, 188.5).

ISOTHERMAL COMPOSITIONS IN % OF SOLID PHASE

Solvent	82 % B + 18 % C	86 % A + 14 % C	57 % A + 43 % B
Solid phase	A	B	C
240.0 °C			93.4
230.0			81.2
220.0			70.7
210.0			61.0
200.0			52.3
190.0			44.5
180.0			37.7
170.0			31.6
160.0			26.0
150.0		92.0	21.4
140.0	99.0	77.2	17.9
130.0	83.0	64.4	15.0
120.0	69.3	53.2	12.3
110.0	57.1	43.1	9.8

105.0°E at 52.0 % A, 39.0 % B, 9.0 % C.
v. also Eq. 1287, 1288, 1291.

1869. $C_7H_5ClO_2$, *o*-Chlorobenzoic acid; B = $C_7H_5ClO_2$, *m*-Chlorobenzoic acid; C = $C_7H_6O_2$, Benzoic acid (50, 188.5).

ISOTHERMAL COMPOSITIONS IN MOL % OF SOLID PHASE

Solvent	27 % B + 73 % C	32 % A + 68 % C	56 % A + 44 % B
Solid phase	A	B	C
150.0 °C		92.0	
140.0	98.9	76.7	
130.0	81.5	63.5	
120.0	67.4	52.2	97.5
110.0	54.3	42.0	84.7
100.0	43.4	34.3	73.5
90.0	34.6	26.5	63.0

81.7°E at 25.0 % A, 20.0 % B, 55.0 % C.
v. also Eq. 1287, 1289, 1292.

1870. $C_7H_5Cl_2NO_2$, *o*-Nitrobenzylidene chloride; B = $C_7H_5Cl_2NO_2$, *m*-Nitrobenzylidene chloride; C = $C_7H_5Cl_2NO_2$, *p*-Nitrobenzylidene chloride (173, 466).

ISOTHERMAL COMPOSITIONS IN % OF SOLID PHASE

Solvent	A + B, A + C, or A + (B + C)	B + C, B + A, or B + (C + A)	C + A, C + B, or C + (A + B)
Solid phase	A	B	C
60.0 °C		90.3	
50.0		71.1	
40.0		55.5	95.0
30.0		42.5	77.2
20.0	87.4	31.5	61.9
10.0	67.1	23.0	48.8
0.0	51.5	16.4	38.2

−2.0°E at 49.0 % A, 15.0 % B, 36.0 % C.

1871. $C_7H_5NO_4$, *o*-Nitrobenzoic acid; B = $C_7H_5NO_4$, *m*-Nitrobenzoic acid; C = $C_7H_5NO_4$, *p*-Nitrobenzoic acid (173, 466).

ISOTHERMAL COMPOSITIONS IN % OF SOLID PHASE

Solvent	A + B, A + C, or A + (B + C)	B + C, B + A, or B + (C + A)	C + A, C + B, or C + (A + B)
Solid phase	A	B	C
230.0 °C			86.6
220.0			74.5
210.0			63.2
200.0			53.7

1871.—(*Continued*)

Solvent	A + B, A + C, or A + (B + C)	B + C, B + A, or B + (C + A)	C + A, C + B, or C + (A + B)
Solid phase	A	B	C
190.0			45.0
180.0			37.8
170.0			31.3
160.0			25.5
150.0			20.8
140.0	88.1	99.0	16.5
130.0	73.5	87.7	12.5
120.0	60.5	77.0	9.0
110.0	49.3	67.0	6.0

ca. 100.0°E, at 39.0 % A, 58.0 % B, 3.0 % C.

1872. $C_7H_5N_3O_6$, 2, 4, 6-Trinitrotoluene; B = $C_7H_6N_2O_4$, 2, 4-Dinitrotoluene; C = $C_7H_7NO_2$, *p*-Nitrotoluene (31, 43, 129, 131).

Isothermal Compositions in Mol % of Solid Phase

Solvent	40 % B + 60 % C	30 % A + 70 % C	38.5 % A + 61.5 % B
Solid phase	A	B	C
70.0 °C	80.0	99.8	
60.0	63.2	82.1	
50.0	49.3	66.9	97.3
40.0	38.0	53.5	80.0
30.0	28.6	42.2	64.8
20.0	22.2	34.4	52.0

16.7°E at 20.2 % A, 31.8 % B, 48.0 % C.

v. also Eq. 1309, 1313, 1350.

1873. $C_7H_5N_3O_6$, 2, 4, 6-Trinitrotoluene; B = $C_7H_7NO_2$, *o*-Nitrotoluene; C = $C_7H_7NO_2$, *p*-Nitrotoluene (30, 31, 33.5, 127, 130, 185).

Isothermal Compositions

Solvent	77 % B + 23 % C	50 % B + 50 % C	31 % A + 69 % C
Solid phase	A, Mol % A	A, Mol % A	(31 % A + 69 % C), Mol % B
70.0 °C	80.2	80.0	
60.0	63.6	63.5	
50.0	50.2	50.0	
40.0	39.5	39.2	
30.0	31.1	30.3	6.0
20.0	25.0	24.5	23.0
+10.0	19.8	19.3	37.7
0.0	15.7		50.0
−10.0	12.0		87.6*

−19.5°E at 9.5 % A, 69.5 % B, 21.0 % C.

v. also Eq. 1312, 1313, 1440.

* Solid phase = B.

1874. $C_7H_6ClNO_2$, *o*-Nitrobenzyl chloride; B = $C_7H_6ClNO_2$, *m*-Nitrobenzyl chloride; C = $C_7H_6ClNO_2$, *p*-Nitrobenzyl chloride (173).

Solvent = 64.6 % A + 35.4 % C	
°C	Mol % B
31.8E	0.0
30.6	5.0
29.8	10.0
27.8	15.0

v. also 1344.

1875. $C_7H_6N_2O_4$, 2, 4-Dinitrotoluene; B = $C_7H_7NO_2$, *o*-Nitrotoluene; C = $C_7H_7NO_2$, *p*-Nitrotoluene (29.5, 30, 31, 127, 129, 185).

1875.—(*Continued*)

Isothermal Compositions

Solvent	50 % B + 50 % C	40 % A + 60 % C
Solid phase	A, Mol % A	(40 % A + 60 % C), Mol % B
60.0 °C	82.3	
50.0	67.5	
40.0	54.5	
30.0	43.5	
20.0	34.0	14.5
+10.0	27.0	32.0
0.0		47.3
−10.0		59.0

−20.0°E at 12.7 % A, 68.7 % B, 18.6 % C.

v. also Eq. 1349, 1440, 1450.

1876. $C_7H_7NO_2$, *o*-Nitrotoluene; B = $C_7H_7NO_2$, *m*-Nitrotoluene; C = $C_7H_7NO_2$, *p*-Nitrotoluene, (30, 32, 127, 185, 466).

Isothermal Compositions in % of Solid Phase

Solvent	76 % B + 24 % C	75 % A + 25 % C	49 % A + 51 % B
Solid phase	A	B	C
40.0 °C			81.0
30.0			66.6
20.0			54.0
+10.0		88.7	43.5
0.0		71.6	35.0
−10.0	87.8	58.0	27.3
−20.0	69.3	51.3	22.0
−30.0	54.2	47.0	17.5

−40.0°E at 42.0 % A, 44.0 % B, 14.0 % C.

1877. $C_7H_{16}O_4S_2$, Sulfonal; B = $C_{10}H_8O$, *β*-Naphthol; C = $C_{13}H_{10}O_3$, Salol (38).

Isothermal Compositions in Mol % of Solid Phase

Solvent	15 % B +85 % C	30 % B +70 % C	50 % B +50 % C	70 % B +30 % C	10 % A +90 % C	50 % A +50 % C
Solid phase	A	A	A	A	B	B
120 °C	86.0	86.8	87.8	88.9	97.3	97.5
110	62.3	64.6	67.7	70.7	82.5	85.0
100	45.5	49.2	54.3	58.9	68.3	73.0
90	34.0	37.2	42.7	48.5	56.0	62.2
80	26.3	28.7	34.0	40.4	46.4	54.5
70	21.5	23.5	28.0	33.8	38.3	47.4
60	18.4	20.4	24.3		31.0	40.8
50	14.6	16.6			25.3	
40	11.5				20	
30	8.5				17.5	

27.0°E at 6.0 % A, 14.0 % B, 80 % C.

v. also 1488, 1489, 1599.

1878. $C_{10}H_5N_3O_6$, 1, 2, 5-Trinitronaphthalene; B = $C_{10}H_5N_3O_6$, 1, 3, 5-Trinitronaphthalene; C = $C_{10}H_5N_3O_6$, 1, 3, 8-Trinitronaphthalene (369).

v. also 1536, 1537, 1539.

1879. $C_{10}H_5N_3O_6$, 1, 3, 5-Trinitronaphthalene; B = $C_{10}H_6N_2O_4$, 1, 5-Dinitronaphthalene; C = $C_{10}H_6N_2O_4$, 1, 8-Dinitronaphthalene (369).

Isothermal Compositions

Solvent	50 % B + 50 % C, Wt. % A	20 % B + 80 % C, Wt. % A	60 % A + 40 % C, Wt. % B
210 °C			94.5
200			77.5
190			63.0
180	1.5		53.0

1879.—(*Continued*)

Solvent	50% B + 50% C, Wt. % A	20% B + 80% C, Wt. % A	60% A + 40% C, Wt. % B
170	11.0		45.5
160	24.0		38.0
150	38.0		31.0
140	51.5	14.0	25.0
130	60.0	31.0	19.0
120	67.5	48.0	13.5
110	75.0	62.0	1.0
100	80.0	71.0	
90		80.5	

v. also 1541, 1542, 1546.

1880. **$C_{10}H_5N_3O_6$**, 1, 3, 8-Trinitronaphthalene; B = $C_{10}H_6N_2O_4$, 1, 5-Dinitronaphthalene; C = $C_{10}H_6N_2O_4$, 1, 8-Dinitronaphthalene (**369**).

Isothermal Compositions

Solvent	50% B + 50% C	25% A + 75% C	50% A + 50% C	75% A + 25% C	50% A + 50% B
	Continuous series of mixed crystals				
Solid phase	Wt. % A	Wt. % B	Wt. % B	Wt. % B	Wt. % C
210 °C	99.0	95.0	94.0	92.5	
200	96.5	79.5	78.0	75.0	
190	93.0	63.5	63.0	60.0	
180	89.0	53.0	52.0	50.0	
170	82.0	46.0	45.0	42.0	99.0
160	75.0	39.0	39.0	35.0	90.5
150	64.0	32.0	31.0	24.0	82.5
140		23.0	23.0		

v. also 1544, 1545, 1546.

1881. **$C_{10}H_6N_2O_4$**, 1, 5-Dinitronaphthalene; B = $C_{10}H_6N_2O_4$, 1, 8-Dinitronaphthalene; C = $C_{10}H_7NO_2$, α-Nitronaphthalene (**369**).

Isothermal Compositions

Solvent	50% B + 50% C, Wt. % A	50% A + 50% B, Wt. % C	20% A + 80% B, Wt. % C
210 °C	95		
200	81		
190	66		
180	54	1.0	
170	45.5	12.0	
160	38.2	25.5	
150	31.0	36.5	
140	25.5	45.0	6.0
130	22.0	51.0	17.0
120	19.0	56.0	29.5
110	13.0	63.0	42.0
100	4.0	69.0	53.0
90		75.0	62.0
80		79.0	69.0
70		82.5	73.5
60		85.5	78.5
50		87.5	83.0

v. also 1546, 1547, 1548.

1882. **$C_{12}H_9N$**, Carbazole; B = $C_{14}H_{10}$, Anthracene; C = $C_{14}H_{10}$, Phenanthrene (**122, 345, 370, 475**).

Isothermal Compositions in Wt. % A

Solvent	80% B + 20% C	60% B + 40% C	40% B + 60% C	20% B + 80% C	5% B + 95% C
240 °C	90.2	90.5	91.0	91.5	91.9
230	72.1	73.5	75.5	77.9	79.5
220	53.5	58.0	62.2	65.8	68.2

1882.—(*Continued*)

Solvent	80% B +20% C	60% B +40% C	40% B +60% C	20% B +80% C	5% B +95% C
210	25.0	42.5	49.3	54.5	57.7
200		23.0	37.7	44.0	48.0
190		7.5	25.8	35.5	39.9
180			14.7	28.5	33.3
170			6.0	23.2	27.5
160				17.0	23.0
150				11.0	19.5
140				4.8	16.0
130					11.5
120					7.4
110					3.0
Transition, %	49.0	43.0	37.5	28.0	15.8

v. also 1676, 1677, 1748.

1883. **$C_{12}H_9N$**, Carbazole; B = $C_{14}H_{10}$, Anthracene; C = $C_{18}H_{12}$, Chrysene (**370**).

v. also 1676, Eq. 1678, 1750.

1883.1. **$C_{14}H_{10}$**, Anthracene (**484**).

Solubility in mixed liquids:

Acetone + ethyl alcohol; acetone + chloroform; acetone + carbon disulfide; benzene + ethyl alcohol; benzene + chloroform; benzene + carbon disulfide; carbon disulfide + ethyl alcohol; carbon tetrachloride + ethyl alcohol; toluene + carbon disulfide; toluene + chloroform.

1884. **$C_{13}H_8N_2O_7$**, Di-(*o*-nitrophenyl) carbonate; B = $C_{13}H_8N_2O_7$, Di-(*o*-, *p*′-nitrophenyl) carbonate; C = $C_{13}H_8N_2O_7$, Di-(*p*-nitrophenyl) carbonate (**159**).

Isothermal Compositions in % of Solid Phase

Solvent	47% B + 53% C	65% A + 35% C	67.5% A + 32.5% B
Solid phase	A	B	C
140.0 °C			96.1
130.0		99.8	79.0
120.0		75.0	63.2
110.0	94.0	56.4	49.8
100.0	73.6	42.2	39.5
90.0	57.5	30.0	31.0

84.5°E at 49.5% A, 23.8% B, 26.7% C.

v. also 1722, 1723, 1724.

1885. **$C_{16}H_{32}O_2$**, Palmitic acid; B = $C_{18}H_{34}O_2$, Oleic acid; C = $C_{18}H_{36}O_2$, Stearic acid (**69, 95.5, 117, 152, 329, 469**).

Isothermal Compositions in Wt. % B

Solvent	82% A + 18% C	60% A + 40% C	40% A + 60% C	15% A + 85% C
15.0 °C	96.0	96.0	96.2	97.3
20.0	91.8	91.8	92.2	94.5
25.0	87.7	87.7	88.5	91.7
30.0	82.7	82.7	83.8	88.5
35.0	75.5	75.5	77.0	83.7
40.0	66.8	66.9	69.0	77.8
45.0	55.0	54.5	57.8	70.0
47.5	46.5	45.5	49.4	64.8
50.0	37.8	36.1	40.8	59.0
52.0	29.5	26.5	33.0	54.5
54.0	19.8	13.4	23.7	48.5
56.0	9.2		14.8	41.5
58.0			5.2	32.5
60.0				25.5
62.0				17.0
64.0				8.5

v. also 1795, 1796, 1826.

1886. $C_{16}H_{32}O_2$, Palmitic acid; B = $C_{18}H_{36}O_2$, Stearic acid; C = $C_{51}H_{98}O_6$, Tripalmitin (246.5).
v. also 1796, Eq. 1800, 1831.

1887. $C_{16}H_{32}O_2$, Palmitic acid; B = $C_{18}H_{36}O_2$, Stearic acid; C = $C_{57}H_{110}O_6$, Tristearin (246.7).
v. also 1796, 1801, 1832.

1888. $C_{16}H_{32}O_2$, Palmitic acid; B = $C_{51}H_{98}O_6$, Tripalmitin; C = $C_{57}H_{110}O_6$, Tristearin (246.7).
v. also 1801, 1850, Eq. 1800.

1889. $C_{18}H_{36}O_2$, Stearic acid; B = $C_{51}H_{98}O_6$, Tripalmitin; C = $C_{57}H_{110}O_6$, Tristearin (246.7).
v. also 1832, 1850, Eq. 1831.

1890. $C_{51}H_{98}O_6$, Tripalmitin; B = $C_{57}H_{104}O_6$, Triolein; C = $C_{57}H_{110}O_6$, Tristearin (261.5)

Isothermal Compositions

Solvent	90% B + 10% C	40% B + 60% C	40% B + 60% C	30% A + 70% C	70% A + 30% C
	Continuous series of mixed crystals				
Solid phase	Wt. % A	Wt. % A	Wt. % A	Wt. % B	Wt. % B
10.0 °C				98.0	97.0
20.0				96.0	94.0
30.0				93.0	89.5
40.0	1.5			87.0	78.0
45.0	29.0			81.5	56.0
50.0	39.5			74.5	40.0
52.0	44.0			70.5	25.0
54.0	49.0	36.0	63.0	65	11.0

Solvent	90% B + 10% C	40% B + 60% C	40% B + 60% C	30% A + 70% C	70% A + 30% C
	Continuous series of mixed crystals				
Solid phase	Wt. % A	Wt. % A	Wt. % A	Wt. % A	Wt. % B
56.0	55.0	27.3	72.0	58	
58.0	63.0	20.5	80.0	43.2	
60.0	74.5	17.0	87.5		
62.0	94.0	13.0	97.0		
64.0		9.0			
65.0		6.0			

v. also 1849, 1850, 1851.

EQUATIONS

$\log_{10}\frac{1}{x} = \frac{0.05223}{T}\,a + b$, in which x is the mole fraction of the given constituent (the "solute") in the solution saturated with respect to it at T°K; a is the latent heat of fusion of this constituent in joules per gram-mole if the solution is "ideal;" b is a constant; and c = 100 × Mol. wt. solute/Mol. wt. solvent. The solubility, S, in grams of solute per 100 grams of solvent, is given by $S = \frac{c}{\left(\frac{1}{x} - 1\right)}$.

No.	Formula	Name	M. P.	a	b	c	Range, °C	Eut. temp. and %	Lit.
7	A CCl_4	Carbon tetrachloride							(344)
	B $C_6H_4Br_2$	*p*-Dibromobenzene	89.0	23,320	− 3.363	153.4	20.0 − 89.0		
9	A CCl_4	Carbon tetrachloride							(344)
	B $C_7H_6O_2$	Benzoic acid		29,870	− 3.955	79.36	10.0 − 40.0		
11	A CCl_4	Carbon tetrachloride							(419, 475)
	B $C_{10}H_8$	Naphthalene	80.1	21,370	− 3.159	83.28	0.0 − 80.1		
12	A CCl_4	Carbon tetrachloride							(475)
	B $C_{12}H_9N$	Carbazole	245.2	30,630	− 2.406	108.6	20.0 − 60.0		
13	A CCl_4	Carbon tetrachloride							(345)
	B $C_{12}H_{10}$	Acenaphthene	95.0	27,800	− 3.945	100.2	10.0 − 95.0		
14	A CCl_4	Carbon tetrachloride							(345)
	B $C_{13}H_{10}$	Fluorene	114.5	25,590	− 3.448	108.0	10.0 − 60.0		
15	A CCl_4	Carbon tetrachloride							(158, 475)
	B $C_{14}H_{10}$	Anthracene	216.5	22,010	− 1.650	115.8	20.0 − 63.0		
16	A CCl_4	Carbon tetrachloride							(153, 158, 475)
	B $C_{14}H_{10}$	Phenanthrene	99.0	23,530	− 3.309	115.8	− 10.0 − 75.0		
22	A CS_2	Carbon disulfide							(419)
	B $C_6H_4Br_2$	*p*-Dibromobenzene	87.0	21,070	− 3.055	309.9	0.0 − 87.0		
28	A CS_2	Carbon disulfide							(475)
	B $C_{12}H_9N$	Carbazole	245.2	27,570	− 1.972	219.4	20.0 − 40.0		
29	A CS_2	Carbon disulfide							(345)
	B $C_{12}H_{10}$	Acenaphthene	95.0	23,710	− 3.362	202.6	10.0 − 95.0		
30	A CS_2	Carbon disulfide							(475)
	B $C_{14}H_{10}$	Anthracene	216.5	26,150	− 2.468	234.0	10.0 − 40.0		
31	A CS_2	Carbon disulfide							(153)
	B $C_{14}H_{10}$	Phenanthrene	99.0	25,530	− 3.767	234.0	− 5.0 − 40.0		
33	A $CHBr_3$	Bromoform	7.5	11,780	− 2.192	324.8	− 26.0 − 7.5	−26.0°	(415)
	B C_6H_6	Benzene	5.5	10,820	− 2.028	30.88	− 15.0 − 5.5	50.0 M % B	
34	A $CHBr_3$	Bromoform	7.5	11,780	− 2.192	274.4	− 35.0 − 7.5		(22)
	B C_7H_8	Toluene							
39	A $CHCl_3$	Chloroform							(436)
	B $C_3H_7NO_2$	Urethane	47.0	18,660	− 3.045	74.61	15.0 − 47.0		
45	A $CHCl_3$	Chloroform	−63.0	12,165	− 3.023	128.3	− 71.0 −− 63.0	−71.0°	(458)
	B C_6H_7N	Aniline	− 6.0	10,485	− 2.050	77.95	− 50.0 −− 6.0	24.0 M % B	
51	A $CHCl_3$	Chloroform							(112, 436, 475)
	B $C_{10}H_8$	Naphthalene	80.1	17,570	− 2.598	107.5	10.0 − 80.1		
52	A $CHCl_3$	Chloroform							(345, 436)
	B $C_{12}H_{10}$	Acenaphthene	95.0	20,290	− 2.880	129.2	50.0 − 95.0		
53	A $CHCl_3$	Chloroform							(460)
	B $C_{14}H_8O_2$	Anthraquinone	285.2	19,140	− 0.960	170.0	0.0 − 60.0		
54	A $CHCl_3$	Chloroform							(153)
	B $C_{14}H_{10}$	Phenanthrene	99.0	16,230	− 2.280	149.1	− 10.0 − 30.0		
85	A CH_4O	Methyl alcohol							(436)
	B $C_3H_7NO_2$	Urethane	47.0	17,790	− 2.935	278.1	0.0 − 47.0		

Equations.—(*Continued*)

No.	Formula	Name	M. P.	a	b	c	Range, °C	Eut. temp. and %	Lit.
98	A CH_4O	Methyl alcohol							(136)
	B C_8H_9NO	Acetanilide		23,740	− 3.208	421.7	0.0 – 60.0		
105	A CH_4O	Methyl alcohol							(475)
	B $C_{14}H_8O_2$	Anthraquinone	285.2	35,970	− 1.939	649.7	20.0 – 50.0		
106	A CH_4O	Methyl alcohol							(475)
	B $C_{14}H_{10}$	Anthracene	216.5	34,150	− 2.303	556.1	10.0 – 60.0		
185	A $C_2H_2Cl_4$	Tetrachloroethane							(475)
	B $C_{14}H_8O_2$	Anthraquinone	285.2	22,525	− 1.754	124.0	20.0 – 140.0		
186	A $C_2H_2Cl_4$	Tetrachloroethane							(475)
	B $C_{14}H_{10}$	Anthracene	216.5	24,310	− 2.423	106.1	10.0 – 140.0		
187	A $C_2H_2Cl_4$	Tetrachloroethane							(475)
	B $C_{14}H_{10}$	Phenanthrene	99.0	15,320	− 2.152	106.3	0.0 – 85.0		
189	A $C_2H_3ClO_2$	α-Chloroacetic acid	61.7	14,645	− 2.284	157.3	− 4.0 – 61.7	−4.0°	(209, 315)
	B $C_2H_4O_2$	Acetic acid	16.7	10,430	− 1.880	63.55	− 4.0 – 16.7	72.0 M % B	
190	A $C_2H_3ClO_2$	α-Chloroacetic acid	61.7	16,660	− 2.598	109.8	26.0 – 61.7	26.0°	(209)
	B $C_4H_6O_2$	Crotonic acid	71.9	12,120	− 1.835	91.1	26.0 – 71.9	52 M % B	
193	A $C_2H_3ClO_2$	α-Chloroacetic acid	61.7	20,870	− 3.257	100.4	16.5 – 61.7	16.5°	(210, 313)
	B C_6H_6O	Phenol	42.4	10,320	− 1.708	99.6	25.0 – 42.4	69.0 M % B	
195	A $C_2H_3ClO_2$	α-Chloroacetic acid	61.7	20,270	− 3.142	77.4	46.7 – 61.7	46.7°	(209)
	B $C_7H_6O_2$	Benzoic acid	121.5	17,790	− 2.357	129.2	60.0 – 121.5	28.5 M % B	
196	A $C_2H_3ClO_2$	α-Chloroacetic acid	61.7	24,030	− 3.748	87.4	15.8 – 61.7	15.8°	(210, 313)
	B C_7H_8O	*o*-Cresol	31.0	18,060	− 3.101	114.4	15.8 – 31.0	69.1 M % B	
197	A $C_2H_3ClO_2$	α-Chloroacetic acid	61.7	24,030	− 3.748	87.4	5.0 – 61.7	81.3°	(313)
	B C_7H_8O	*m*-Cresol	10.5	10,190	− 1.876	114.4	− 3.0 – 10.5	81.3 M % B	
198	A $C_2H_3ClO_2$	α-Chloroacetic acid	61.7	24,030	− 3.748	87.4	20.0 – 61.7	13.4°	(313)
	B C_7H_8O	*p*-Cresol	36.0	10,625	− 1.795	114.4	13.4 – 36.0	72.0 M % B	
203	A $C_2H_3ClO_2$	α-Chloroacetic acid	61.7	16,175	− 2.523	69.43	30.5 – 61.7	30.5°	(209)
	B $C_8H_8O_2$	Phenylacetic acid	77.5	14,710	− 2.192	144.04	30.5 – 77.5	46.0 M % B	
204	A $C_2H_3ClO_2$	α-Chloroacetic acid	61.7	21,160	− 3.211	69.43	47.3 – 61.7	47.3°	(209)
	B $C_8H_8O_2$	*o*-Toluic acid	103.4	21,920	− 3.042	144.04	75.0 – 103.4	28.2 M % B	
205	A $C_2H_3ClO_2$	α-Chloroacetic acid	61.7	19,725	− 3.077	69.43	46.5 – 61.7	46.5°	(209)
	B $C_8H_8O_2$	*m*-Toluic acid	107.6	18,860	− 2.587	144.04	80.0 – 107.6	28.8 M % B	
206	A $C_2H_3ClO_2$	α-Chloroacetic acid	61.7	19,725	− 3.077	69.43	56.8 – 61.7	56.8°	(209)
	B $C_8H_8O_2$	*p*-Toluic acid	178.6	24,620	− 2.847	144.04	56.8 – 178.6	9.3 M % B	
208	A $C_2H_3ClO_2$	α-Chloroacetic acid	61.7	18,380	− 2.866	63.8	47.6 – 61.7	47.6°	(209)
	B $C_9H_8O_2$	Cinnamic acid	136.8	18,210	− 2.308	156.7	85.0 – 136.8	25.0 M % B*	
215	A $C_2H_3ClO_2$	α-Chloroacetic acid	61.4	22,810	− 3.562	44.1	26.7 – 61.4	26.7°	(315)
	B $C_{13}H_{10}O_3$	Salol	40.85	25,460	− 4.237	226.8	26.7 – 40.85	60.5 M % B	
220	A $C_2H_3ClO_2$	β-Chloroacetic acid	56.6	18,090	− 2.865	100.4	20.0 – 56.6	11.8°	(313)
	B C_6H_6O	Phenol	42.0	10,320	− 1.708	99.6	25.0 – 42.4	65.0 M % B	
221	A $C_2H_3ClO_2$	β-Chloroacetic acid	56.6	18,130	− 2.873	87.4	13 – 56.6	13.0°	(313)
	B C_7H_8O	*o*-Cresol	31.0	18,060	− 3.101	114.4	13 – 31.0	63.55 M % B	
222	A $C_2H_3ClO_2$	β-Chloroacetic acid	56.6	18,680	− 2.960	87.4	− 4.5 – 56.6	−4.5°	(313)
	B C_7H_8O	*m*-Cresol	10.5	10,190	− 1.876	114.4	− 4.5 – 10.5	78.7 M % B	
223	A $C_2H_3ClO_2$	β-Chloroacetic acid	56.6	18,090	− 2.866	87.4	20.0 – 56.6	10.7°	(313)
	B C_7H_8O	*p*-Cresol	36.0	10,625	− 1.795	114.4	10.7 – 36.0	69.3 M % B	
230	A $C_2H_3ClO_2$	β-Chloroacetic acid	56.6	20,770	− 3.292	44.1	25.4 – 56.4	25.4°	(315)
	B $C_{13}H_{10}O_3$	Salol	40.85	25,460	− 4.237	226.8	25.4 – 40.85	57.0 M % B	
245	A $C_2H_4Br_2$	Ethylene dibromide	9.7	11,520	− 2.128	240.6	− 20.0 – 9.7	−27.6°	(36)
	B C_6H_6	Benzene	5.5	10,450	− 1.959	41.56	− 27.6 – 5.5	54.0 M % B	
248	A $C_2H_4Br_2$	Ethylene dibromide	9.7	12,475	− 2.304	142.2	− 10 – 9.7	−20.0°	(375)
	B $C_6H_{12}O_3$	Paraldehyde	12.0	13,470	− 2.468	70.32	− 20 – 12.0	49.0 M % B	
249	A $C_2H_4Br_2$	Ethylene dibromide	9.7	11,480	− 2.121	109.8	− 10 – 9.7	−12.4°	(375)
	B C_7H_7Br	*p*-Bromotoluene	26.74	15,880	− 2.767	91.05	0.0 – 26.74	36.1 M % B	
250	A $C_2H_4Br_2$	Ethylene dibromide	9.7	11,980	− 2.212	204.0	− 40.0 – 9.7		(22)
	B C_7H_8	Toluene							
251	A $C_2H_4Br_2$	Ethylene dibromide	9.7	11,710	− 2.163	177.05	− 20.0 – 9.7	−20°	(375)
	B C_8H_{10}	*p*-Xylene	13.5	14,660	− 2.672	56.48	− 20.0 – 13.5	44.0 M % B	
252	A $C_2H_4Br_2$	Ethylene dibromide	9.7	11,445	− 2.113	146.65	0.25– 9.7	0.25°	(16, 86)
	B $C_{10}H_8$	Naphthalene	80.1	18,525	− 2.739	68.19	30 – 80.1	15.1 M % B	
255	A $C_2H_4Br_2$	Ethylene dibromide	9.7	11,520	− 2.128	111.05	− 5.3 – 9.7	−5.3°	(86)
	B $C_{12}H_{11}N$	Diphenylamine	52.9	18,140	− 2.907	90.05	5.0 – 52.9	24.4 M % B	
257	A $C_2H_4Cl_2$	Ethylene dichloride	−40.0	12,480	− 2.878	126.7	− 53.0 – −40.0	−53.0°	(21)
	B C_6H_6	Benzene	5.5	9,940	− 1.798	78.93	− 53.0 – 5.5	32.5 M % B	
258	A $C_2H_4Cl_2$	Ethylene dichloride							(345)
	B $C_{10}H_8$	Naphthalene	80.1	18,270	− 2.702	129.4	− 10 – 80.1		
267	A $C_2H_4O_2$	Acetic acid	16.7	11,575	− 2.087	50.86	8.4 – 16.7	8.4°	(212)
	B $C_4H_6O_4$	Dimethyl oxalate	53.2	34,780	− 3.533	196.6	20.0 – 53.2	14.0 M % B	
275	A $C_2H_4O_2$	Acetic acid	16.7	10,870	− 1.959	63.83	− 15.0 – 16.7	−15.0°	(312, 345)
	B C_6H_6O	Phenol	40.5	12,480	− 2.078	156.7	10.0 – 40.5	41.5 M % B	
277	A $C_2H_4O_2$	Acetic acid	16.7	11,385	− 2.052	41.2	− 7.0 – 16.7	−7.0°	(212)
	B $C_6H_{10}O_4$	Dimethyl succinate	18.2	27,520	− 4.938	242.7	− 7.0 – 18.2	34.0 M % B	
279	A $C_2H_4O_2$	Acetic acid	16.7	11,385	− 2.052	203.3	9.5 – 16.7	9.5°	(209, 345)
	B $C_7H_6O_2$	Benzoic acid	121.4	18,510	− 2.450	49.19	40.0 – 121.4	12.0 M % B	
284	A $C_2H_4O_2$	Acetic acid	15.05	11,290	− 2.047	39.99	− 4.27– 15.05	−4.27°	(375)
	B $C_{10}H_{14}O$	Thymol	49.32	19,890	− 3.222	250.0	20.0 – 49.32	28.4 M % B	

* 36.3 M % B at 70.0°.

Equations.—(*Continued*)

No.	Formula	Name	M. P.	a	b	c	Range, °C	Eut. temp. and %	Lit.
285	A $C_2H_4O_2$	Acetic acid							(475)
	B $C_{12}H_9N$	Carbazole	245.2	25,530	−1.780	276.5	20.0 − 110		
287	A $C_2H_4O_2$	Acetic acid							(475)
	B $C_{14}H_8O_2$	Anthraquinone	285.2	31,910	−2.093	344.5	25.0 − 100.0		
288	A $C_2H_4O_2$	Acetic acid							(475)
	B $C_{14}H_{10}$	Anthracene	216.5	31,840	−2.470	296.7	20.0 − 100.0		
292	A C_2H_5NO	Acetamide	79.0	14,590	−2.168	128.2	40.0 − 78.5		(436)
	B C_2H_6O	Ethyl alcohol							
293	A C_2H_5NO	Acetamide	79.0	15,980	−2.370	66.30	27.2 − 79.0	27.2°	(344)
	B $C_3H_7NO_2$	Urethane	49.0	18,660	−3.026	150.9	27.2 − 49.0	39.0 M % B	
314	A C_2H_6O	Ethyl alcohol							(436)
	B $C_3H_7NO_2$	Urethane	47.0	20,290	−3.331	193.3	15.0 − 47.0		
335	A C_2H_6O	Ethyl alcohol							(436)
	B C_7H_9N	*p*-Toluidine	42.0	27,000	−4.472	232.4	0.0 − 42.0		
345	A C_2H_6O	Ethyl alcohol							(136)
	B C_8H_9NO	Acetanilide		15,690	−2.120	293.3	0.0 − 80.0		
356	A C_2H_6O	Ethyl alcohol							(475)
	B $C_{14}H_8O_2$	Anthraquinone	285.2	42,640	−3.179	451.7	20.0 − 70.0		
380	A C_3H_6O	Acetone							(345)
	B $C_{10}H_8$	Naphthalene	80.1	23,760	−3.513	228.4	10.0 − 80.1		
381	A C_3H_6O	Acetone							(475)
	B $C_{12}H_9N$	Carbazole	245.2	12,390	−0.595	287.7	20.0 − 60.0		
382	A C_3H_6O	Acetone							(345)
	B $C_{12}H_{10}$	Acenaphthene	95.0	37,980	−5.390	265.5	10.0 − 95.0		
383	A C_3H_6O	Acetone							(345)
	B $C_{13}H_{10}$	Fluorene	114.5	30,250	−4.078	286.1	10.0 − 50.0		
384	A C_3H_6O	Acetone							(475)
	B $C_{14}H_8O_2$	Anthraquinone	285.2	27,570	−1.436	358.5	15.0 − 60.0		
385	A C_3H_6O	Acetone							(475)
	B $C_{14}H_{10}$	Anthracene	216.5	26,640	−2.176	307.0	15.0 − 55.0		
386	A C_3H_6O	Acetone							(153)
	B $C_{14}H_{10}$	Phenanthrene	99.0	22,080	−3.096	307.0	−10.0 − 30.0		
389	A $C_3H_7NO_2$	Urethane	47.0	21,151	−3.451	148.2	25.0 − 47.0	*	(436)
	B C_3H_8O	Propyl alcohol							
390	A $C_3H_7NO_2$	Urethane	47.0	22,010	−3.571	101.1	35.0 − 47.0	20°	(245)
	B $C_5H_{12}O$	*n*-Amyl alcohol						26.0 M % A	
397	A $C_3H_7NO_2$	Urethane	48.3	18,080	−2.932	65.94	41.0 − 48.3	41.0°	(344, 345)
	B C_8H_9NO	Acetanilide	113.0	26,220	−3.545	151.6	41.0 − 113.0	15.3 M % B	
468	A $C_4H_8O_2$	Ethyl acetate							(345)
	B $C_{10}H_8$	Naphthalene	80.1	22,200	−3.282	145.3	10.0 − 80.1		
469	A $C_4H_8O_2$	Ethyl acetate							(475)
	B $C_{14}H_{10}$	Anthracene	216.5	26,720	−2.319	197.7	25.0 − 70.0		
470	A $C_4H_8O_2$	Ethyl acetate							(475)
	B $C_{14}H_{10}$	Phenanthrene	99.0	24,910	−3.534	202.5	10.0 − 65.0		
496	A $C_4H_{10}O$	Ethyl ether							(419)
	B $C_6H_4Br_2$	*p*-Dibromobenzene	87	24,210	−3.512	318.4	10.0 − 87.0		
503	A $C_4H_{10}O$	Ethyl ether							(345)
	B $C_{10}H_8$	Naphthalene	80.1	22,500	−3.326	172.9	15.0 − 35.0		
504	A $C_4H_{10}O$	Ethyl ether							(475)
	B $C_{14}H_8O_2$	Anthraquinone	285.2	27,070	−1.076	280.8	5.0 − 30.0		
505	A $C_4H_{10}O$	Ethyl ether							(153, 157)
	B $C_{14}H_{10}$	Phenanthrene	99.0	21,610	−2.968	240.5	−10.0 − 30.0		
509	A C_5H_5N	Pyridine	−39.4	7,407	−1.656	101.25	−57 − −39.4	−57.0°	(151, 385)
	B C_6H_6	Benzene	5.5	11,325	−2.124	98.75	−40 − 5.5	26.5 M % B	
516	A C_5H_5N	Pyridine	−39.4					−41.0°	(151, 345)
	B $C_{10}H_8$	Naphthalene	80.1	18,370	−2.717	162.0	0.0 − 80.1	3.8 M % B	
518	A C_5H_5N	Pyridine							(345)
	B $C_{12}H_{10}$	Acenaphthene	95.0	27,350	−3.881	195.0	20.0 − 95.0		
519	A C_5H_5N	Pyridine							(345)
	B $C_{13}H_{10}$	Fluorene	114.5	22,980	−3.097	210.1	10.0 − 114.5		
520	A C_5H_5N	Pyridine							(475)
	B $C_{14}H_8O_2$	Anthraquinone	285.2	30,090	−2.533	263.2	10.0 − 100.0		
522	A C_5H_5N	Pyridine							(475)
	B $C_{14}H_{10}$	Phenanthrene	99.0	17,810	−2.502	225.5	5.0 − 75.0		
524	A $C_5H_{11}N$	Piperidine	−13.0	13,590	−2.728	103.65	−30 − −13	−30.0°	(321)
	B C_6H_{12}	Cyclohexane	6.2	19,815	−3.704	96.5	−5.0 − 6.2	35.5 M % B	
555	A $C_6H_3N_3O_6$	1, 3, 5-Trinitrobenzene	120.3	15,050	−2.002	126.7	76 − 120.3	76.0°	(43)
	B $C_6H_4N_2O_4$	*o*-Dinitrobenzene	116.5	22,690	−3.041	78.9	69.0 − 116.5	44.5 M % B	
	A $C_6H_3N_3O_6$	1, 3, 5-Trinitrobenzene (metastable)	106.3	13,430	−1.849	126.7	69.0 − 106.3	69.0°	
								37.4 M % B	
556	A $C_6H_3N_3O_6$	1, 3, 5-Trinitrobenzene	120.3	15,080	−2.002	126.7	59.0 − 120.3	59.0°	(43)
	B $C_6H_4N_2O_4$	*m*-Dinitrobenzene	89.9	17,980	−2.588	78.9	52.5 − 89.9	57.5 M % B	
	A $C_6H_3N_3O_6$	1, 3, 5-Trinitrobenzene (metastable)	106.3	13,430	−1.849	126.7	52.5 − 106.3	52.5°	
								50.7 M % B	

* 19.5 M % A at 0°, 32.0 M % A at 10°.

Equations.—(*Continued*)

No.	Formula	Name	M. P.	a	b	c	Range. °C	Eut. temp. and %	Lit.
564	A $C_6H_3N_3O_6$	1, 3, 5-Trinitrobenzene	120.3	14,730	− 1.951	93.9	55.8 – 120.3	55.8°	(43, 109)
	B $C_7H_5N_3O_6$	Trinitrotoluene	80.2	21,340	− 3.157	106.5	52 – 80.2	57.0 M % B	
	A $C_6H_3N_3O_6$	1, 3, 5-Trinitrobenzene (metastable)	106.3	14,200	− 1.954	93.9	52.0 – 106.3	52.0°	
								53.0 M % B	
565	A $C_6H_3N_3O_6$	1, 3, 5-Trinitrobenzene	120.3	14,830	− 1.969	74.24	82.6 – 120.3	82.6°	(43)
	B $C_7H_5N_5O_8$	Tetranitrophenylmethylaniline (Tetryl)	128.5	24,790	− 3.222	134.7	75.5 – 128.5	38.3 M % B	
	A $C_6H_3N_3O_6$	1, 3, 5-Trinitrobenzene (metastable)	106.3	13,870	− 1.910	74.24	75.5 – 106.3	75.5°	
								32.0 M % B	
583	A $C_6H_3N_3O_7$	Picric acid	122.3	17,605	− 2.326	136.2	61.0 – 122.3	61.0°	(43)
	B $C_6H_4N_2O_4$	*m*-Dinitrobenzene	89.9	16,520	− 2.372	76.85	61.0 – 89.9	62.4 M % B	
584	A $C_6H_3N_3O_7$	Picric acid	122.3	17,410	− 2.300	124.4	87.0 – 122.3	81.5°	(43)
	B $C_6H_4N_2O_5$	2, 4-Dinitrophenol	112.5	23,730	− 3.217	80.37	92.0 – 112.5	47.5 M % B	
585	A $C_6H_3N_3O_7$	Picric acid	122.4	40,200	− 5.310	100.4	113.5 – 122.4	113.5°	(105)
	B $C_6H_4N_4O_6$	Picramide	184.0	27,490	− 3.142	99.57	127.0 – 184.0	25.0 M % B	
586	A $C_6H_3N_3O_7$	Picric acid	120.0	17,410	− 2.314	164.8	34.0 – 120.0	34.0°	(259)
	B $C_6H_5NO_3$	*o*-Nitrophenol	45.5	17,890	− 2.934	60.70	34.0 – 45.5	77.8 M % B	
587	A $C_6H_3N_3O_7$	Picric acid	120.0	19,146	− 2.542	164.8	71.0 – 120.0	71.0°	(259)
	B $C_6H_5NO_3$	*m*-Nitrophenol	94.5	23,730	− 3.372	60.70	71.0 – 94.5	56.9 M % B	
588	A $C_6H_3N_3O_7$	Picric acid	120.0	19,146	− 2.542	164.8	79.0 – 120.0	79.0°	(259)
	B $C_6H_5NO_3$	*p*-Nitrophenol	113.0	22,690	− 3.069	60.7	79.0 – 113.0	50.0 M % B	
594	A $C_6H_3N_3O_7$	Picric acid	122.0	18,070	− 2.389	100.9	59.7 – 122.0	59.7°	(43, 134, 448)
	B $C_7H_5N_3O_6$	Trinitrotoluene	80.3	20,880	− 3.082	99.13	59.7 – 80.3	64.0 M % B	
596	A $C_6H_3N_3O_7$	Picric acid	121.8	19,530	− 2.582	125.8	65.0 – 121.8	53.3°	(43)
	B $C_7H_6N_2O_4$	2, 4-Dinitrotoluene	69.5	21,060	− 3.211	79.52	53.3 – 69.5	69.0 M % B	
656	A C_6H_4BrCl	*o*-Bromochlorobenzene	−12.1	12,250	− 2.451	100	− 18.6 – −12.1	−18.6°	(181)
	B C_6H_4BrCl	*p*-Bromochlorobenzene	64.6	18,510	− 2.862	100	25.0 – 64.6	13.3 M % B	
661	A $C_6H_4BrNO_2$	*o*-Bromonitrobenzene	38.5	16,875	− 2.829	100	16.85 – 38.5	16.85°	(350)
	B $C_6H_4BrNO_2$	*m*-Bromonitrobenzene	52.56	20,710	− 3.322	100	16.85 – 52.56	38.7 M % B	
662	A $C_6H_4BrNO_2$	*o*-Bromonitrobenzene	38.5	19,240	− 3.225	100	34.24 – 38.5	34.24°	(160, 350)
	B $C_6H_4BrNO_2$	*p*-Bromonitrobenzene	124.92	24,310	− 3.190	100	45.0 – 124.92	10.6 M % B	
664	A $C_6H_4BrNO_2$	*o*-Bromonitrobenzene	38.5	21,380	− 3.584	265.2	− 8.7 – 38.5	−8.7°	(47)
	B C_6H_6	Benzene	5.5	11,500	− 2.152	37.72	− 8.7 – 5.5	77.0 M % B	
665	A $C_6H_4BrNO_2$	*m*-Bromonitrobenzene	52.56	20,200	− 3.223	100	44.75 – 52.56	44.75°	(350)
	B $C_6H_4BrNO_2$	*p*-Bromonitrobenzene	124.92	22,730	− 2.983	100	44.75 – 124.92	17.5 M % B	
669	A $C_6H_4BrNO_2$	*m*-Bromonitrobenzene	52.6	25,740	− 4.130	265.2	− 3.1 – 52.6	−3.1°	(47)
	B C_6H_6	Benzene	5.5	11,500	− 2.152	37.72	− 3.1 – 5.5	86.0 M % B	
671	A $C_6H_4BrNO_2$	*p*-Bromonitrobenzene	124.3	27,660	− 3.636	265.2	50.0 – 124.3	3.7°	(47)
	B C_6H_6	Benzene	5.5	11,500	− 2.152	37.72	3.7 – 5.5	97.0 M % B	
672	A $C_6H_4Br_2$	*o*-Dibromobenzene	6.7	13,970	− 2.609	100	0.3 – 6.7	0.3°	(181)
	B $C_6H_4Br_2$	*p*-Dibromobenzene	86.7	20,010	− 2.903	100	20.0 – 86.7	13.0 M % B	
673	A $C_6H_4Br_2$	*p*-Dibromobenzene	88.3	23,510	− 3.399	149.7	34.0 – 88.3	34.0°	(379.5)
	B $C_6H_4ClNO_2$	*m*-Chloronitrobenzene	45.5	20,010	− 3.280	66.79	34.0 – 45.5	75.0 M % B	
677	A $C_6H_4Br_2$	*p*-Dibromobenzene	87.0	20,290	− 2.944	150.3	5.0 – 87.0		(419)
	B C_6H_5Br	Bromobenzene							
678	A $C_6H_4Br_2$	*p*-Dibromobenzene	89.0	24,500	− 3.536	191.7	20.0 – 89.0		(244)
	B $C_6H_5NO_2$	Nitrobenzene							
679	A $C_6H_4Br_2$	*p*-Dibromobenzene	87.0	21,070	− 3.055	302.4	10.0 – 87.0		(344, 418)
	B C_6H_6	Benzene							
680	A $C_6H_4Br_2$	*p*-Dibromobenzene	89.0	30,950	− 4.466	253.5	20.0 – 89.0		(344)
	B C_6H_7N	Aniline							
682	A $C_6H_4Br_2$	*p*-Dibromobenzene	89.0	20,800	− 3.001	256.2	10.0 – 89.0		(344)
	B C_7H_8	Toluene							
687	A $C_6H_4ClNO_2$	*o*-Chloronitrobenzene	32.09	16,805	− 2.875	100	14.65 – 32.09	14.65°	(161)
	B $C_6H_4ClNO_2$	*p*-Chloronitrobenzene	82.15	14,640	− 2.152	100	35.0 – 82.15	33.1 M % B	
688	A $C_6H_4ClNO_2$	*o*-Chloronitrobenzene	31.5	21,540	− 3.695	201.8	− 10.6 – 31.5	−10.6°	(47)
	B C_6H_6	Benzene	5.5	11,190	− 2.199	49.55	− 10.6 – 5.5	74.5 M % B	
693	A $C_6H_4ClNO_2$	*m*-Chloronitrobenzene	43.7	24,510	− 4.040	201.8	− 5.7 – 43.7	−5.7°	(47)
	B C_6H_6	Benzene	5.5	11,190	− 2.199	49.55	− 5.7 – 5.5	82.2 M % B	
697	A $C_6H_4ClNO_2$	*p*-Chloronitrobenzene	82.3	17,240	− 2.533	201.8	− 4.0 – 82.3	−4.0°	(47)
	B C_6H_6	Benzene	5.5	11,190	− 2.199	49.55	− 4.0 – 5.5	84.7 M % B	
701	A $C_6H_4Cl_2$	*o*-Dichlorobenzene	−17.5	13,205	− 2.699	100	− 23.4 – −17.5	−23.4°	(181)
	B $C_6H_4Cl_2$	*p*-Dichlorobenzene	52.6	18,010	− 2.889	100	− 23.4 – 52.6	13.3 M % B	
703	A $C_6H_4Cl_2O_4S_2$	*m*-Benzenedisulfonyl chloride	60.0	18,180	− 2.851	100	46.2 – 60.0	46.2° *	(175)
	B $C_6H_4Cl_2O_4S_2$	*p*-Benzenedisulfonyl chloride	140.8	14,550	− 1.836	100	71.0 – 140.8	24.6 M % B	
707	A $C_6H_4INO_2$	*o*-Iodonitrobenzene	54.0					46.6°	(162, 171)
	B $C_6H_4INO_2$	*p*-Iodonitrobenzene	173.1	26,410	− 3.091	100	60.0 – 173.1	*ca.* 5.0 M % B	
708	A $C_6H_4N_2O_4$	*o*-Dinitrobenzene	116.5	22,490	− 3.016	100	80.0 – 116.5	64.0°	(43)
	B $C_6H_4N_2O_4$	*m*-Dinitrobenzene	89.9	16,940	− 2.438	100	64.0 – 89.9	65.0 M % B	
709	A $C_6H_4N_2O_4$	*o*-Dinitrobenzene	116.5	33,500	− 4.492	215.4	50.0 – 116.5	4.3°†	(228)
	B C_6H_6	Benzene	5.2					98.0 M % B	
714	A $C_6H_4N_2O_4$	*o*-Dinitrobenzene	116.5	22,880	− 3.068	74.05	63.8 – 116.5	63.8°	(43)
	B $C_7H_5N_3O_6$	2, 4, 6-Trinitrotoluene	80.2	25,520	− 3.772	135.2	63.8 – 80.2	66.0 M % B	
716	A $C_6H_4N_2O_4$	*o*-Dinitrobenzene	116.5	22,590	− 3.030	92.28	55.4 – 116.5	55.4°	(43)
	B $C_7H_6N_2O_4$	2, 4-Dinitrotoluene	69.5	21,630	− 3.299	108.4	55.4 – 96.5	72.6 M % B	

* 33.7 M % B at 60°.

† 2.5 M % A at 20°, 5.3 M % B at 35°.

Equations.—(*Continued*)

No.	Formula	Name	M. P.	a	b	c	Range, °C	Eut. temp. and %	Lit.
719	A $C_6H_4N_2O_4$	*o*-Dinitrobenzene	116.0	23,350	− 3.135	131.3	62.0 – 116.0	62.0°	(259)
	B $C_{10}H_8$	Naphthalene	80.1	21,050	− 3.112	76.17	62.0 – 80.1	68.0 M % B	
720	A $C_6H_4N_2O_4$	*o*-Dinitrobenzene	116.5	20,800	− 2.790	117.5	90.0 – 116.5	30.2°*	(237)
	B $C_{10}H_9N$	α-Naphthylamine	48.0	12,250	− 1.992	85.1	30.2 – 48.0	76.4 M % B	
721	A $C_6H_4N_2O_4$	*o*-Dinitrobenzene	116.5	20,800	− 2.790	117.5	90.0 – 116.5	73.5°	(237)
	B $C_{10}H_9N$	β-Naphthylamine	109.0	19,880	− 2.718	85.1	73.5 – 109.0	52.8 M % B	
723	A $C_6H_4N_2O_4$	*o*-Dinitrobenzene	116.5	23,600	− 3.163	109.1	71.5 – 116.5	71.5°	(239)
	B $C_{12}H_{10}$	Acenaphthene	92.5	24,260	− 3.468	91.7	71.5 – 92.5	61.5 M % B	
724	A $C_6H_4N_2O_4$	*o*-Dinitrobenzene	116.5	22,280	− 2.937	101.2	78.0 – 116.5	78.0°	(230)
	B $C_{13}H_{10}$	Fluorene	112.5	20,100	− 2.723	98.8	78.0 – 112.5	53.0 M % B	
726	A $C_6H_4N_2O_4$	*o*-Dinitrobenzene	116.5	26,150	− 3.515	94.4	75.0 – 116	75.0°	(228)
	B $C_{14}H_{10}$	Phenanthrene	103.0	18,800	− 2.614	105.9	75.0 – 103.0	61.0 Wt. % B	
730	A $C_6H_4N_2O_4$	*m*-Dinitrobenzene	89.8	20,590	− 2.921	215.4	− 0.8 – 89.8	−0.8°	(228, 419)
	B C_6H_6	Benzene	5.2	11,500	− 2.155	46.43	− 0.8 – 5.2	89.3 M % B	
738	A $C_6H_4N_2O_4$	*m*-Dinitrobenzene	89.9	16,930	− 2.436	74.05	52.3 – 89.9	52.3°	(43, 130)
	B $C_7H_5N_3O_6$	2, 4, 6-Trinitrotoluene	80.3	25,510	− 3.770	135.1	52.3 – 80.3	47.5 M % B	
739	A $C_6H_4N_2O_4$	*m*-Dinitrobenzene	89.9	17,550	− 2.524	92.28	44.9 – 89.9	44.9°	(43, 130)
	B $C_7H_6N_2O_4$	2, 4-Dinitrotoluene	69.5	21,630	− 3.299	108.4	44.9 – 69.5	56.0 M % B	
741	A $C_6H_4N_2O_4$	*m*-Dinitrobenzene	89.4	17,570	− 2.531	122.7	40.0 – 89.4	29.7°	(130)
	B $C_7H_7NO_2$	*p*-Nitrotoluene	51.4	15,410	− 2.480	81.52	29.7 – 51.4	66.5 M % B	
743	A $C_6H_4N_2O_4$	*m*-Dinitrobenzene	90.2	23,000	− 3.307	124.4	68.5 – 90.2	68.5°	(82)
	B C_8H_9NO	Acetanilide	113.5	23,570	− 3.186	80.35	68.5 – 113.5	38.5 M % B	
751	A $C_6H_4N_2O_4$	*m*-Dinitrobenzene	89.0	17,640	− 2.547	101.2	70.0 – 89.0	54.0°	(230)
	B $C_{13}H_{10}$	Fluorene	112.5	17,420	− 2.236	98.8	70.0 – 112.5	42.2 M % B	
753	A $C_6H_4N_2O_4$	*m*-Dinitrobenzene	89.5	16,940	− 2.441	94.4	60.0 – 89.5	48.5°	(228)
	B $C_{14}H_{10}$	Phenanthrene	103.5	15,020	− 2.909	105.9	60.0 – 103.5	49.0 Wt. % B	
766	A $C_6H_4N_2O_4$	*p*-Dinitrobenzene	169.5	23,930	− 2.824	109.1	90.0 – 169.5	81.5°	(239)
	B $C_{12}H_{10}$	Acenaphthene	92.5	22,300	− 3.188	91.7	81.5 – 92.5	80.0 M % B	
767	A $C_6H_4N_2O_4$	*p*-Dinitrobenzene	172.0	25,840	− 3.033	101.2	130.0 – 172.0	90.0°	(230)
	B $C_{13}H_{10}$	Fluorene	112.5	17,420	− 2.336	98.8	95.0 – 112.5	72.0 M % B	
768	A $C_6H_4N_2O_4$	*p*-Dinitrobenzene	171.5	24,730	− 2.905	94.35	146.0 – 171.5	146.0°	(252)
	B $C_{14}H_{10}$	Anthracene	212.5	27,500	− 2.960	106.0	146.0 – 212.5	35.0 Wt. % B	
772	A $C_6H_4N_2O_6$	2, 4-Dinitrophenol	112.5	23,730	− 3.217	132.4	50.0 – 112.5	36.5°	(82)
	B $C_6H_5NO_3$	*o*-Nitrophenol	46.2	17,890	− 2.926	75.54	36.5 – 46.2	81.5 M % B	
781	A $C_6H_4N_2O_6$	2, 4-Dinitrophenol	112.5	25,760	− 3.492	136.25	79.0 – 112.5	79.0°	(82)
	B C_6H_9NO	Acetanilide	113.5	19,300	− 2.609	73.35	79.0 – 113.5	56.0 M % B	
791	A $C_6H_4N_2O_6$	2, 4-Dinitrophenol	112.0	22,300	− 3.024	110.8	74.0 – 112.0	74.0°	(230)
	B $C_{13}H_{10}$	Fluorene	112.5	17,540	− 2.366	90.24	74.0 – 112.5	54.8 M % B	
793	A $C_6H_4N_2O_5$	2, 4-Dinitrophenol	111.0					101.0°	(252)
	B $C_{14}H_{10}$	Anthraeene	213.0	24,820	− 2.668	96.8	101.0 – 213.0	15.5 Wt. % B	
822	A C_6H_5BrO	*o*-Bromophenol	5.5	10,910	− 2.049	100	− 11.7 – 5.5	−11.7°	(183)
	B C_6H_5BrO	*p*-Bromophenol	63.5	14,200	− 2.203	100	20.0 – 63.5	27.2 M % B	
825	A C_6H_5Cl	Chlorobenzene	−45	8,770	− 2.008	80.06	− 54.2 – −45.0	−54.2°	(331)
	B C_7H_5ClO	Benzoyl chloride	− 0.5	14,560	− 2.790	124.9	− 40.0 – −0.5	18.0 M % B	
827	A C_6H_5Cl	Chlorobenzene							(112, 419, 436 475)
	B $C_{10}H_8$	Naphthalene	80.1	18,200	− 2.690	113.9	− 10.0 – 80.1		
829	A C_6H_5Cl	Chlorobenzene							(345)
	B $C_{12}H_{10}$	Acenaphthene	95.0	21,820	− 3.098	137.0	10.0 – 95.0		
830	A C_6H_5Cl	Chlorobenzene							(147.6)
	B $C_{13}H_{10}$	Fluorene	114.5	21,150	− 2.851	147.6	40.0 – 114.5	†	
831	A C_6H_5Cl	Chlorobenzene							(475)
	B $C_{14}H_{10}$	Anthraeene	216.5	27,470	− 2.807	158.4	25.0 – 120.0		
832	A C_6H_5Cl	Chlorobenzene							(475)
	B $C_{14}H_{10}$	Phenanthrene	99.0	18,410	− 2.587	158.3	10.0 – 80.0		
834	A C_6H_5ClO	*o*-Chlorophenol	8.8	10,260	− 1.901	100	− 10.0 – 8.8	−20.5°	(183)
	B C_6H_5ClO	*p*-Chlorophenol	42.9	11,160	− 1.844	100	20.0 – 42.9	38.5 M % B‡	
844	A C_6H_5IO	*o*-Iodophenol	40.4	18,810	− 3.135	100	26.1 – 40.4	26.1°	(183)
	B C_6H_5IO	*p*-Iodophenol	92.7	18,700	− 2.670	100	60.0 – 92.7	29.5 M % B	
848	A $C_6H_5NO_2$	Nitrobenzene	5.3	13,220	− 2.481	157.6	− 15.0 – 5.3	−24.6°	(86, 430)
	B C_6H_6	Benzene	5.5	12,975	− 2.432	63.43	− 24.6 – 5.5	51.0 M % B	
850	A $C_6H_5NO_2$	Nitrobenzene	5.3	13,210	− 2.477	89.12	1.0 – 5.3	1.0°	(48)
	B $C_6H_6N_2O_2$	*o*-Nitroaniline	71.1	27,090	− 4.110	112.2	10.0 – 71.1	8.5 M % B	
851	A $C_6H_5NO_2$	Nitrobenzene	5.3	13,210	− 2.477	89.12	2.0 – 5.3	2.0°	(48)
	B $C_6H_6N_2O_2$	*m*-Nitroaniline	112.0	26,510	− 3.598	112.2	50.0 – 112.0	6.3 M % B	
852	A $C_6H_5NO_2$	Nitrobenzene	5.3	13,210	− 2.477	89.12	2.5 – 5.3	2.5°	(48)
	B $C_6H_6N_2O_2$	*p*-Nitroaniline	149.0	24,210	− 2.998	112.2	60.0 – 149.0	5.5 M % B	
853	A $C_6H_5NO_2$	Nitrobenzene	5.3	15,310	− 2.871	130.8	− 16.5 – 5.3	−16.5°	(86, 345)
	B C_6H_6O	Phenol	40.5	10,775	− 1.795	76.43	5.0 – 40.5	43.0 M % B	
857	A $C_6H_5NO_2$	Nitrobenzene	6.0	13,930	− 2.608	87.58	− 20.3 – 6.0	−20.3°	(331)
	B C_7H_5ClO	Benzoyl chloride	− 0.5	22,020	− 4.218	114.2	− 20.3 – −0.5	46.6 M % B	
858	A $C_6H_5NO_2$	Nitrobenzene							(344)
	B $C_7H_6O_2$	Benzoie aeid		23,070	− 3.055	99.20	10.0 – 80.0		
861	A $C_6H_5NO_2$	Nitrobenzene	5.3	13,210	− 2.477	96.1	− 3.0 – 5.3	−3.0°	(222, 475)
	B $C_{10}H_8$	Naphthalene	80.1	19,240	− 2.845	104.1	20.0 – 80.1	15.5 M % B§	

* 33.3 M % A at 50°, 45.4 M % A at 70°.

† 7.6 M % B at 0°, 12.9 M % B at 20°.

‡ 52.5 M % B at 0°.

§ 20.6 M % B at 10°.

Equations.—(*Continued*)

No.	Formula	Name	M. P.	a	b	c	Range, °C	Eut. temp. and %	Lit.
863	A $C_6H_5NO_2$	Nitrobenzene							(475)
	B $C_{12}H_9N$	Carbazole	245.2	24,010	– 2.397	135.7	20.0 – 180.0		
864	A $C_6H_5NO_2$	Nitrobenzene							(345)
	B $C_{12}H_{10}$	Acenaphthene	95.0	22,870	– 3.246	125.2	10.0 – 95.0		
866	A $C_6H_5NO_2$	Nitrobenzene							(345)
	B $C_{13}H_{10}$	Fluorene	114.5	21,380	– 2.880	135.0	10.0 – 114.5		
867	A $C_6H_5NO_2$	Nitrobenzene							(475)
	B $C_{14}H_8O_2$	Anthraquinone	285.2	29,780	– 2.634	169.0	25.0 – 190.0		
868	A $C_6H_5NO_2$	Nitrobenzene							(475)
	B $C_{14}H_{10}$	Anthracene	216.5	29,010	– 3.134	144.7	5.0 – 175.0		
868.1	A $C_6H_5NO_2$	Nitrobenzene							(475)
	B $C_{14}H_{10}$	Phenanthrene	99.0	16,640	– 2.338	144.8	5.0 – 85.0		
869	A $C_6H_5NO_3$	*o*-Nitrophenol	44.0	20,520	– 3.380	100	31.5 – 44.0	31.5°	(71)
	B $C_6H_5NO_3$	*m*-Nitrophenol	94.0	19,300	– 2.747	100	31.5 – 94.0	27.5 M % B	
870	A $C_6H_5NO_3$	*o*-Nitrophenol	44.0	21,050	– 3.470	100	33.5 – 44.0	33.5°	(71)
	B $C_6H_5NO_3$	*p*-Nitrophenol	114.0	17,300	– 2.334	100	33.5 – 114.0	24.5 M % B	
881	A $C_7H_5NO_3$	*o*-Nitrophenol	44.5	17,980	– 2.953	129.8	15.0 – 44.5	15.0°	(379, 381)
	B C_7H_9N	*p* Toluidine	37.5	18,025	– 2.975	77.04	15.0 – 43.3	51.0 M % B	
884	A $C_6H_5NO_3$	*o*-Nitrophenol	45.0	20,960	– 3.442	108.6	29.0 – 45.0	29.0°	(222, 410)
	B $C_{10}H_8$	Naphthalene	80.1	18,790	– 2.779	92.1	29.0 – 80.1	34.0 M % B	
885	A $C_6H_5NO_3$	*o*-Nitrophenol	44.5	18,680	– 3.072	97.18	20.0 – 44.5	14.0°	(237)
	B $C_{10}H_9N$	α-Naphthylamine	48.0	13,980	– 2.276	102.9	20.0 – 48.0	52.0 M % B	
886	A $C_6H_5NO_3$	*o*-Nitrophenol	44.5	20,100	– 3.310	97.18	36.3 – 44.5	36.3°	(237)
	B $C_{10}H_9N$	β-Naphthylamine	109.0	24,000	– 3.282	102.9	36.3 – 109.0	16.6 M % B	
891	A $C_6H_5NO_3$	*o*-Nitrophenol	44.6					43.5°	(263)
	B $C_{12}H_9N$	Carbazole	236.0	27,350	– 2.807	120.1	43.5 – 236.0	2.3 Wt. % B	
899	A $C_6H_5NO_3$	*m*-Nitrophenol	94.0	18,790	– 2.673	100	61.5 – 94.0	61.5°	(71)
	B $C_6H_5NO_3$	*p*-Nitrophenol	114.0	16,305	– 2.200	100	61.5 – 114.0	45.2 M % B	
916	A $C_6H_5NO_3$	*m*-Nitrophenol	95.0					92.0°	(263)
	B $C_{12}H_9N$	Carbazole	236.1	33,050	– 3.395	120.1	92.0 – 236.1	5.5 Wt. % B	
943	A $C_6H_5NO_3$	*p*-Nitrophenol	111.8					106.7°	(263)
	B $C_{12}H_9N$	Carbazole	236.0	34,460	– 3.541	120.1	106.7 – 236.0	7.4 M % B	
948	A $C_6H_5NO_3$	*p*-Nitrophenol	113.5					106.0°	(252)
	B $C_{14}H_{10}$	Anthracene	212.5	50,390	– 5.420	128.1	150.0 – 212.5	6.0 Wt. % B*	
954	A $C_6H_5N_3O_4$	2, 4-Dinitroaniline	179.5	22,520	– 2.600	132.6	160.0 – 179.5		(148)
	B $C_6H_6N_2O_2$	*o*-Nitroaniline							
955	A $C_6H_5N_3O_4$	2, 4-Dinitroaniline	179.5	22,520	– 2.600	132.6	117.0 – 179.5	117.0°	(148)
	B $C_6H_6N_2O_2$	*p*-Nitroaniline	148.3	20,650	– 2.562	75.4	117.0 – 148.3	62.5 M % B	
962	A C_6H_6	Benzene	5.5	27,500	– 5.160	83.0	– 4.0 – 5.5	–5.3°	(86, 151, 345,
	B C_6H_6O	Phenol	40.6	12,860	– 2.142	120.5	20.0 – 40.6	37.0 M % B†	375, 458)
968	A C_6H_6	Benzene	5.5	9,860	– 1.849	59.12	– 27.0 – 5.5	–27.0°	(375)
	B $C_6H_{12}O_3$	Paraldehyde	12.0	13,475	– 2.469	169.1	– 20.0 – 12.0	43.0 M % B	
969	A C_6H_6	Benzene	5.5	11,675	– 2.189	55.56	– 20.0 – 5.5	–26.5°	(331)
	B C_7H_5ClO	Benzoyl chloride	– 0.5	15,690	– 3.008	180.0	– 20.0 – –0.5	51.9 M % B	
979	A C_6H_6	Benzene	5.5	11,330	– 2.124	45.52	– 3.3 – 5.5	–3.3°	(292)
	B $C_7H_6ClNO_2$	Nitrobenzyl chloride	47.7	25,090	– 4.085	219.7	10.0 – 47.7	15.0 M % B	
980	A C_6H_6	Benzene	5.2	11,500	– 2.155	36.81	– 0.7 – 5.2	–0.7°	(228)
	B $C_7H_6N_2O_4$	2, 4-Dinitrotoluene	70.7	24,120	– 3.665	233.4	– 0.7 – 70.7	10.5 M % B	
981	A C_6H_6	Benzene	5.2	11,500	– 2.155	36.81	0.2 – 5.2	0.2°	(228)
	B $C_7H_6N_2O_4$	2, 6-Dinitrotoluene	65.0	19,430	– 3.002	233.4	40.0 – 65.0	10.7 M % B‡	
982	A C_6H_6	Benzene	5.2	11,500	– 2.155	36.81	– 5.0 – 5.2	–5.0°	(228)
	B $C_7H_6N_2O_4$	3, 4-Dinitrotoluene	59.0	18,850	– 2.964	233.4	25.0 – 59.0	24.5M % B§	
991	A C_6H_6	Benzene	5.48	10,320	– 1.934	45.61	– 18.5 – 5.48	–18.5°	(375)
	B C_7H_7Br	*p*-Bromotoluene	26.71	15,405	– 2.684	219.3	– 18.5 – 26.71	33.6 M % B	
992	A C_6H_6	Benzene	5.5	9,825	– 1.842	84.75	– 70.0 – 5.5	–99.8°	(400)
	B C_7H_8	Toluene	–94.5	7,280	– 2.115	118.0	– 99.8 – –94.5	86.3 M % B‖	
1003	A C_6H_6	Benzene	5.5	10,090	– 1.893	73.6	– 22.2 – 5.5	–22.2°	(375, 377)
	B C_8H_{10}	*p*-Xylene	13.35	16,650	– 3.035	135.9	– 22.2 – 13.35	37.3 M % B	
1005	A C_6H_6	Benzene	5.5	10,105	– 1.894	60.96	– 3.5 – 5.5	–3.5°	(112, 385, 419,
	B $C_{10}H_8$	Naphthalene	80.1	19,340	– 2.860	164.1	– 3.5 – 80.1	12.5 M % B	436, 475, 476)
1008	A C_6H_6	Benzene	5.5	8,865	– 1.662	57.35	– 20.0 – 5.5	–45.0°	(282)
	B $C_{10}H_{16}$	Camphene	49.3	2,583	– 0.4175	174.4	– 20.0 – 49.3	64.6 M % B¶	
1011	A C_6H_6	Benzene	5.48	10,525	– 1.974	50.65	– 5.8 – 5.48	–5.8°	(476)
	B $C_{12}H_{10}$	Diphenyl	68.95	17,130	– 2.615	197.4	10.0 – 68.95	16.8 M % B	
1012	A C_6H_6	Benzene	5.5	12,340	– 2.314	46.14	– 6.8 – 5.5	–6.8°	(55, 86)
	B $C_{12}H_{11}N$	Diphenylamine	52.9	18,470	– 2.959	216.7	– 6.8 – 52.9	21.5 M % B	
1013	A C_6H_6	Benzene	5.5						(345)
	B $C_{12}H_{12}N_2$	Hydrazobenzene	127.0	28,130	– 3.675	235.9	20.0 – 127.0		
1014	A C_6H_6	Benzene							(345)
	B $C_{13}H_{10}$	Fluorene	114.5	22,500	– 3.031	212.8	10.0 – 114.5		
1016	A C_6H_6	Benzene							(460)
	B $C_{14}H_8O_2$	Anthraquinone	285.2	28,300	– 2.004	266.6	0.0 – 80.0		
1017	A C_6H_6	Benzene							(158, 460, 475)
	B $C_{14}H_{10}$	Anthracene	216.5	27,180	– 2.620	228.2	0.0 – 80.0		

* 11.9 Wt. % B at 130°.
† 50.5 M % B at 5.0°.
‡ 21.9 M % B at 15.0°, 41.2 M % B at 30°.
§ 33.0 M % B at 10°.
‖ 83.0 M % B at 80.0°.
¶ 44.4 M % B at –30.0°; 64.6 M % B at –30.0°.

Equations.—(*Continued*)

No.	Formula	Name	M. P.	a	b	c	Range, °C	Eut. temp. and %	Lit.
1018	A C_6H_6	Benzene							(153, 158, 475)
	B $C_{14}H_{10}$	Phenanthrene	99.0	19,650	− 2.763	228.2	5.0 – 75.0		
1020	A C_6H_6	Benzene	5.5						(345)
	B $C_{14}H_{16}N_2$	Hydrazotoluene	159.0	33,690	− 4.072	271.8	20 – 159.0		
1021	A C_6H_6	Benzene	5.5						(345)
	B $C_{14}H_{16}N_2O_2$	Hydrazoanisole	104.3	27,580	− 3.816	312.8	20 – 104.3		
1033	A $C_6H_6N_2O_2$	*m*-Nitroaniline	114.0	25,300	− 3.417	102.2	81.0 – 114.0	81.0°	(82)
	B C_8H_9NO	Acetanilide	113.5	30,620	− 4.140	97.9	85.0 – 113.5	52.0 M % B	
1050	A C_6H_6O	Phenol	41.0	9,175	− 1.525	77.0	22.0 – 41.0	22.0°	(258)
	B $C_7H_6O_2$	*m*-Hydroxybenzaldehyde	105.0	17,110	− 2.363	129.8	30.0 – 105.0	20.3 M % B	
1091	A $C_6H_6O_2$	Catechol	103.0	16,880	− 2.343	90.18	70.0 – 103.0	61.0°	(258)
	B $C_7H_6O_2$	*m*-Hydroxybenzaldehyde	105.0	16,570	− 2.289	110.9	61.0 – 105.0	50.0 M % B	
1103	A $C_6H_6O_2$	Catechol	103.2					102.0°	(263)
	B $C_{12}H_9N$	Carbazole	236.0	43,070	− 4.427	151.8	102.0 – 236.0	4.0 Wt. % B	
1117	A $C_6H_6O_2$	Resorcinol	115.0	12,490	− 1.682	90.8	59.0 – 115.0	59.0°	(258)
	B $C_7H_6O_2$	*m*-Hydroxybenzaldehyde	105.0	16,570	− 2.289	110.9	65.0 – 105.0	48.0 M % B	
1132	A $C_6H_6O_2$	Resorcinol	109.0					107.0°*	(263)
	B $C_{12}H_9N$	Carbazole	236.0	50,860	− 5.227	151.8	160.0 – 236.0	7.0 Wt. % B	
1170	A $C_6H_6O_3$	Pyrogallol	132.5	16,550	− 2.131	103.3	69.0 – 132.5	69.0°	(258)
	B $C_7H_6O_2$	*m*-Hydroxybenzaldehyde	105.0	15,210	− 2.101	96.83	69.0 – 105.0	60.0 M % B	
1179	A $C_6H_6O_3$	Pyrogallol	126.5					126.0°	(263)
	B $C_{12}H_9N$	Carbazole	236.0	58,860	− 6.047	132.5	126.0 – 236.0	2.9 Wt. % B	
1195	A C_6H_7N	Aniline	− 5.5	8,810	− 1.718	67.90	− 15.7 – −5.5	−15.7°	(222)
	B $C_7H_7NO_2$	*p*-Nitrotoluene	51.5	17,170	− 2.762	147.3	10.0 – 51.5	15.0 M % B†	
1201	A C_6H_7N	Aniline							(345)
	B C_7H_9N	*p*-Toluidine		16,460	− 2.714	115.0	20.0 – 43.6		
1207	A C_6H_7N	Aniline							(345)
	B $C_{12}H_{10}$	Acenaphthene	95.0	33,120	− 4.700	165.6	10.0 – 95.0		
1208	A C_6H_7N	Aniline							(345)
	B $C_{13}H_{10}$	Fluorene	114.5	28,230	− 3.808	178.5	10.0 – 114.5		
1209	A C_6H_7N	Aniline							(475)
	B $C_{14}H_8O_2$	Anthraquinone	285.2	30,140	− 2.759	223.6	15.0 – 170.0		
1211	A C_6H_7N	Aniline							(475)
	B $C_{14}H_{10}$	Phenanthrene	99.0	30,350	− 4.349	191.5	5.0 – 80.0		
1269	A $C_6H_{12}O_3$	Paraldehyde	12.0	13,530	− 2.480	124.5	− 14.14– 12.0	−14.14°	(375)
	B C_8H_{10}	*p*-Xylene	13.35	17,550	− 2.371	80.32	− 5.0 – 13.35	43.5 M % B	
1271	A C_6H_{14}	Hexane							(112, 419, 436)
	B $C_{10}H_8$	Naphthalene	80.1	33,020	− 4.882	148.6	10.0 – 80.1		
1280	A $C_7H_4Cl_2O_3S$	*sym*-Chloride of *m*-sulfobenzoic acid	20.4	17,180	− 3.059	100	8.4 – 20.4	8.4°	(308)
	B $C_7H_4Cl_2O_3S$	*sym*-Chloride of *p*-sulfobenzoic acid	56.7	19,880	− 3.149	100	20.0 – 56.7	26.0 M % B	
1283	A C_7H_5ClO	Benzoyl chloride	− 0.5	15,690	− 3.008	132.4	− 18.5 – −0.5	−18.5°	(331)
	B C_8H_{10}	*p*-Xylene	13.5	17,880	− 3.259	75.53	− 18.5 – 13.5	38.2 M % B	
1284	A C_7H_5ClO	Benzoyl chloride	−0.5	15,080	− 2.890	117.0	− 25.0 – −0.5	−70.0°‡	(331)
	B C_9H_{12}	Mesitylene	−55.4	5,360	− 1.287	85.5	− 70.0 – −55.4	81.0 M % B	
1285	A C_7H_5ClO	Benzoyl chloride	− 0.5	16,270	− 3.118	91.16	− 8.0 – −0.5	−8.0°	(331)
	B $C_{12}H_{10}$	Diphenyl	70.5	18,510	− 2.812	109.7	30.0 – 70.5	16.8 M % B§	
1286	A C_7H_5ClO	Benzoyl chloride	− 0.5	15,350	− 2.940	83.56	− 15.0 – −0.5	−15.0°	(331)
	B $C_{13}H_{12}$	Diphenylmethane	26.0	19,620	− 3.427	119.7	− 15.0 – 26.0	31.2 M % B	
1287	A $C_7H_5ClO_2$	*o*-Chlorobenzoic acid	140.7	23,670	− 2.989	100	120 – 140.7	109.9°	(50)
	B $C_7H_5ClO_2$	*m*-Chlorobenzoic acid	155.0	24,900	− 3.038	100	120 – 155.0	43.0 M % B	
1288	A $C_7H_5ClO_2$	*o*-Chlorobenzoic acid	140.7	23,670	− 2.989	100	132.0 – 140.7	132.0°	(50)
	B $C_7H_5ClO_2$	*p*-Chlorobenzoic acid	245.0	30,480	− 3.072	100	150.0 – 245.0	14.0 M % B	
1289	A $C_7H_5ClO_2$	*o*-Chlorobenzoic acid	140.7	26,450	− 3.340	128.2	100.0 – 140.7	91.2°	(50)
	B $C_7H_6O_2$	Benzoic acid	121.7	17,300	− 2.290	77.99	91.2 – 121.7	64.5 M % B	
1291	A $C_7H_5ClO_2$	*m*-Chlorobenzoic acid	155.0	24,900	− 3.038	100	140.9 – 155.0	140.9°	(50)
	B $C_7H_5ClO_2$	*p*-Chlorobenzoic acid	245.0	28,240	− 2.848	100	150.0 – 245.0	20.0 M % B	
1292	A $C_7H_5ClO_2$	*m*-Chlorobenzoic acid	155.0	26,600	− 3.248	128.2	110 – 155	95.4°	(50)
	B $C_7H_6O_2$	Benzoic acid	121.7	17,300	− 2.290	77.99	95.4 – 121.7	68.7 M % B	
1294	A $C_7H_5ClO_2$	*p*-Chlorobenzoic acid	245.0	29,300	− 2.961	128.2	130 – 245	115.0°	(50)
	B $C_7H_6O_2$	Benzoic acid	121.7	17,300	− 2.290	77.99	115.0 – 121.7	9.0 M % B	
1307	A $C_7H_5N_3O_6$	2, 4, 5-Trinitrotoluene	101.5	22,010	− 3.070	100	65.0 – 101.5	57.5°	(130)
	B $C_7H_5N_3O_6$	2, 4, 6-Trinitrotoluene	80.5	20,860	− 3.082	100	60.0 – 80.5	61.0 M % B	
1309	A $C_7H_5N_3O_6$	2, 4, 6-Trinitrotoluene	80.5	21,920	− 3.239	124.6	45.0 – 80.5	45.0°	(31, 43, 129)
	B $C_7H_6N_2O_4$	2, 4-Dinitrotoluene	70.1	18,950	− 2.884	80.22	55.0 – 70.1	57.0 M % B	
1310	A $C_7H_5N_3O_6$	2, 4, 6-Trinitrotoluene	80.5	20,860	− 3.082	124.6	50 – 80.5	37.5°	(129)
	B $C_7H_6N_2O_4$	2, 6-Dinitrotoluene	65.0	16,780	− 2.593	80.22	50 – 65.0	61.0 M % B	
1312	A $C_7H_5N_3O_6$	2, 4, 6-Trinitrotoluene	80.5	21,340	− 3.152	165.6	45 – 80.5	−9.7°	(30)
	B $C_7H_7NO_2$	*o*-Nitrotoluene	− 4.0	14,260	− 2.766	60.37	− 9.7 – −4.0	87.6 M % B‖	
1313	A $C_7H_5N_3O_6$	2, 4, 6-Trinitrotoluene	80.5	21,920	− 3.239	165.6	40 – 80.5	33.9°	(31, 130)
	B $C_7H_7NO_2$	*p*-Nitrotoluene	51.4	16,075	− 2.589	60.37	35 – 51.4	69.0 M % B	
1333	A C_7H_6ClNO	*o*-Chloroformanilide	78.0	18,080	− 2.690	100	54.9 – 78.0	54.9°	(215)
	B C_7H_6ClNO	*p*-Chloroformanilide	103.0	22,300	− 3.098	100	54.9 – 103.0	35.3 M % B	
1334	A $C_7H_6ClNO_2$	2-Chloro-3-nitrotoluene	22.1	14,960	− 2.648	100	8.2 – 22.1	8.2°	(479)
	B $C_7H_6ClNO_2$	2-Chloro-4-nitrotoluene	62.3	18,080	− 2.817	100	30.0 – 62.3	26.0 M % B	
1335	A $C_7H_6ClNO_2$	2-Chloro-3-nitrotoluene	22.1	15,020	− 2.657	100	5.0 – 22.1	−1.0°	(479)
	B $C_7H_6ClNO_2$	2-Chloro-5-nitrotoluene	42.9	14,160	− 2.340	100	10.0 – 42.9	41.0 M % B	

* 8.0 Wt. % B at 120°; 11.3 Wt. % B at 140.0°.
† 24.1 M % B at −5.0°.
‡ 36.1 M % A at −40.0°, 26.1 M % A at −55.0°.
§ 21.4 M % B at 0.0°; 30.1 M % B at 15.0°.
‖ 30.0 M % A at 27.7°; 20.0 M % B at 10°.

Equations.—(*Continued*)

No.	Formula	Name	M. P.	a	b	c	Range, °C	Eut. temp. and %	Lit.
1337	A $C_7H_6ClNO_2$	2-Chloro-3-nitrotoluene	23.4	13,680	− 2.410	100	0 – 23.4	−5.0°	(480)
	B $C_7H_6ClNO_2$	3-Chloro-4-nitrotoluene	24.2	16,800	− 2.952	100	5 – 24.2	45.0 M % B	
1338	A $C_7H_6ClNO_2$	2-Chloro-3-nitrotoluene	23.4	13,680	− 2.410	100	− 5.4 – 23.4	−5.4°	(480)
	B $C_7H_6ClNO_2$	3-Chloro-6-nitrotoluene	24.9	17,350	− 3.041	100	− 5.4 – 24.9	45.0 M % B	
1340	A $C_7H_6ClNO_2$	2-Chloro-4-nitrotoluene	62.3	18,080	− 2.817	100	30 – 62.3	17.0°	(479)
	B $C_7H_6ClNO_2$	2-Chloro-6-nitrotoluene	35.3	16,110	− 2.729	100	20 – 35.3	66.0 M % B	
1341	A $C_7H_6ClNO_2$	2-Chloro-5-nitrotoluene	42.9	14,160	− 2.340	100	20 – 42.9	6.4°	(479)
	B $C_7H_6ClNO_2$	2-Chloro-6-nitrotoluene	35.3	16,070	− 2.722	100	6.4 – 35.3	52.0 M % B	
1342	A $C_7H_6ClNO_2$	3-Chloro-4-nitrotoluene	24.2	18,025	− 3.168	100	5.0 – 24.2	3.4°	(480)
	B $C_7H_6ClNO_2$	3-Chloro-6-nitrotoluene	24.9	20,000	− 3.508	100	10.0 – 24.9	48.0 M % B	
1343	A $C_7H_6ClNO_2$	4-Chloro-2-nitrotoluene	30.0	19,720	− 3.400	100	− 8.1 – 30.0	−8.1°	(170)
	B $C_7H_6ClNO_2$	4-Chloro-3-nitrotoluene	6.5	15,880	− 2.968	100	− 8.1 – 6.5	68.4 M % B	
1346	A $C_7H_6N_2O_3$	*o*-Nitroformanilide	122.4	24,700	− 3.261	100	112.3 – 122.4	112.3°	(148)
	B $C_7H_6N_2O_3$	*p*-Nitroformanilide	195.1	31,950	− 3.523	100	112.3 – 195.1	17.7 M % B	
1347	A $C_7H_6N_2O_4$	2, 4-Dinitrotoluene	70.1	18,510	− 2.816	100	33.6 – 70.1	33.6°	(129)
	B $C_7H_6N_2O_4$	2, 6-Dinitrotoluene	65.0	16,780	− 2.593	100	33.6 – 65.0	54.0 M % B	
1349	A $C_7H_6N_2O_4$	2, 4-Dinitrotoluene	70.1	17,825	− 2.712	132.9	15 – 70.1	−11.45°	(30)
	B $C_7H_7NO_2$	*o*-Nitrotoluene	− 4.45	14,260	− 2.766	75.25	− 11.45– −4.45	84.2 M % B*	
1350	A $C_7H_6N_2O_4$	2, 4-Dinitrotoluene	70.1	17,825	− 2.712	132.9	30 – 70.1	26.5°	(31, 129)
	B $C_7H_7NO_2$	*p*-Nitrotoluene	51.4	16,075	− 2.589	75.25	26.5 – 51.4	60.0 M % B	
1358	A $C_7H_6N_2O_4$	2, 4-Dinitrotoluene	69.0	21,820	− 3.332	109.6	55 – 69.0	44.0°	(230)
	B $C_{13}H_{10}$	Fluorene	112.5	17,375	− 2.330	91.2	80 – 112.5	40.0 M % B†	
1362	A $C_7H_6N_2O_4$	2, 6-Dinitrotoluene	65.0	16,740	− 2.588	132.9	30 – 65		(130)
	B $C_7H_7NO_2$	*p*-Nitrotoluene	51.4	16,080	− 2.588	75.25	30 – 51.4		
1384	A $C_7H_6N_2O_5$	2, 4-Dinitroanisole	86.9	19,620	− 2.847	93.42	53.5 – 86.9	53.5°	(41)
	B $C_8H_8N_2O_5$	2, 4-Dinitrophenetole	85.0	22,210	− 3.240	107.0	53.5 – 85.0	49.0 M % B	
1385	A $C_7H_6O_2$	*m*-Hydroxybenzaldehyde	105.0	19,530	− 2.698	100	83.0 – 105.0	83.0°	(258)
	B $C_7H_6O_2$	Benzoic acid	121.5	30,430	− 4.030	100	95.0 – 121.5	33.0 M % B	
1386	A $C_7H_6O_2$	*m*-Hydroxybenzaldehyde	105.0	16,550	− 2.287	88.40	90.0 – 105.0	90.0°	(258)
	B $C_7H_6O_3$	Salicylic acid	159.5	30,530	− 3.689	113.1	90.0 – 159.5	20.0 M % B	
1387	A $C_7H_6O_2$	*m*-Hydroxybenzaldehyde	105.0	18,570	− 2.564	84.70	61.5 – 105.0	61.5°	(258)
	B $C_{10}H_8O$	*α*-Naphthol	96.0	18,500	− 2.619	118.0	61.5 – 96.0	54.0 M % B	
1388	A $C_7H_6O_2$	*m*-Hydroxybenzaldehyde	105.0	18,180	− 2.510	84.70	74.0 – 105.0	74.0°	(258)
	B $C_{10}H_8O$	*β*-Naphthol	121.5	20,100	− 2.661	118.0	85.0 – 121.5	40.7 M % B	
1396	A $C_7H_6O_2$	Benzoic acid	121.4	19,550	− 2.589	81.32	50.0 – 121.4	27.3°	(213)
	B $C_8H_6O_3$	Piperonal	35.5	18,180	− 3.078	123.0	27.3 – 35.5	82.8 M % B	
1397	A $C_7H_6O_2$	Benzoic acid	121.4	18,280	− 2.420	101.7	10.0 – 121.4		(344)
	B C_8H_8O	Acetophenone							
1400	A $C_7H_6O_2$	Benzoic acid	121.5	16,690	− 2.209	82.46	82.0 – 121.5	82.0°	(207, 209)
	B $C_9H_8O_2$	Cinnamic acid	136.8	19,050	− 2.427	121.3	90.0 – 136.8	43.0 M % B	
1401	A $C_7H_6O_2$	Benzoic acid	121.0	24,020	− 3.182	95.3	70.0 – 121.0	70.0°	(115, 345, 465)
	B $C_{10}H_8$	Naphthalene	80.1	37,710	− 5.580	104.9	70.0 – 80.1	67.0 M % B	
1407	A $C_7H_6O_2$	Benzoic acid	121.4	21,630	− 2.865	58.09	95.0 – 121.4	77.2°	(213)
	B $C_{14}H_{10}O_2$	Benzil	94.0	33,110	− 4.714	172.2	77.2 – 94.0	59.3 M % B	
1417	A C_7H_7Br	*o*-Bromotoluene	−27.0	11,480	− 2.436	100	− 37.3 – −27.0	−37.3°	(172, 293)
	B C_7H_7Br	*p*-Bromotoluene	26.7	14,540	− 2.534	100	− 25.0 – 26.7	21.7 M % B	
1422	A C_7H_7Cl	*o*-Chlorotoluene	−35.1	9,285	− 2.038	100	− 49.8 – −35.1	−49.8°	(466, 474)
	B C_7H_7Cl	*p*-Chlorotoluene	7.8	12,665	− 2.356	100	− 35.0 – 7.8	27.0 M % B	
1426	A $C_7H_7ClO_2S$	*o*-Toluenesulfone chloride	10.1	13,210	− 2.437	100	1.5 – 10.1	1.5°	(145, 179)
	B $C_7H_7ClO_2S$	*p*-Toluenesulfone chloride	67.2	21,350	− 3.276	100	1.5 – 67.2	16.5 M % B	
1439	A $C_7H_7NO_2$	*o*-Nitrotoluene	− 4.0	13,015	− 2.526	100	− 31.65– −4.0	−31.65°	(32)
	B $C_7H_7NO_2$	*m*-Nitrotoluene	16.0	13,700	− 2.476	100	− 5.0 – 16.0	48.0 M % B	
1440	A $C_7H_7NO_2$	*o*-Nitrotoluene	− 4.0	13,015	− 2.526	100	− 16.4 – −4.0	−16.3°	(30, 127, 185)
	B $C_7H_7NO_2$	*p*-Nitrotoluene	51.4	15,440	− 2.485	100	15.0 – 51.4	24.0 M % B‡	
1441	A $C_7H_7NO_2$	*m*-Nitrotoluene	16.0	13,700	− 2.476	100	− 2.8 – 16.0	−2.8°	(32, 127)
	B $C_7H_7NO_2$	*p*-Nitrotoluene	51.4	15,440	− 2.485	100	15.0 – 51.4	33.0 M % B	
1443	A $C_7H_7NO_2$	*p*-Nitrotoluene	52.0	16,610	− 2.669	107.0	35.0 – 52.0	29.0°	(222)
	B $C_{10}H_8$	Naphthalene	80.1	17,700	− 2.618	93.44	40.0 – 80.1	36.5 M % B	
1445	A $C_7H_7NO_3$	*p*-Nitroanisole	52.6	16,660	− 2.671	90.50	20.5 – 52.6	20.5°	(393, 394)
	B $C_{12}H_{11}N$	Diphenylamine	53.2	17,380	− 2.781	110.5	20.5 – 53.2	49.0 M % B	
1446	A C_7H_8	Toluene							(112, 345, 419,
	B $C_{10}H_8$	Naphthalene	80.1	19,850	− 2.935	139.1	20.0 – 80.1		436, 475)
1448	A C_7H_8	Toluene							(345, 436)
	B $C_{12}H_{10}$	Acenaphthene	95.0	22,780	− 3.233	167.4	10.0 – 95.0		
1449	A C_7H_8	Toluene							(345)
	B $C_{13}H_{10}$	Fluorene	114.5	22,500	− 3.031	180.5	10.0 – 114.5		
1450	A C_7H_8	Toluene							(475)
	B $C_{14}H_8O_2$	Anthraquinone	285.2	28,720	− 2.086	226.0	20.0 – 105		
1451	A C_7H_8	Toluene							(475)
	B $C_{14}H_{10}$	Anthracene	216.5	27,290	− 2.654	193.5	15.0 – 105.0		
1452	A C_7H_8	Toluene							(153, 157, 475)
	B $C_{14}H_{10}$	Phenanthrene	99.0	19,340	− 2.717	193.5	0.0 – 90.0		
1471	A C_7H_9N	*o*-Toluidine							(345)
	B C_7H_9N	*p*-Toluidine	43.6	16,260	− 2.682	100	0.0 – 43.6		
1473	A C_7H_9N	*m*-Toluidine							(345)
	B C_7H_9N	*p*-Toluidine	43.6	16,260	− 2.682	100	20.0 – 43.6		

* 20.0 M % A at −1.8°.
† 51.6 M % B at 65.0°.
‡ 35.0 % B at 0.0°.

Equations.—(*Continued*)

No.	Formula	Name	M. P.	a	b	c	Range, °C	Eut. temp. and %	Lit.
1475	A C_7H_9N	*p*-Toluidine	43.5	22,400	− 3.695	83.56	31.9 − 43.5	31.9°	(15, 345, 406)
	B $C_{10}H_8$	Naphthalene	80.1	24,020	− 3.275	119.6	40.0 − 80.1	27.5 M % B	
1487	A $C_7H_9NO_2S$	*o*-Toluenesulfoneamide	137.4	24,680	− 3.140	100	110.5 − 137.4	110.5°	(94, 347)
	B $C_7H_9NO_2S$	*p*-Toluenesulfoneamide	156.3	27,580	− 3.352	100	110.5 − 156.3	39.8 M % B	
1490	A $C_8H_4Cl_2O_2$	*sym*-Phthalyl chloride	16.3	21,220	− 3.828	100	8.0 − 16.3	8.0°	(84)
	B $C_8H_4Cl_2O_2$	*asym*-Phthalyl chloride	88.5	16,460	− 2.378	100	35.0 − 88.5	23.0 M % B	
1492	A $C_8H_4O_3$	Phthalic anhydride	130.84	23,210	− 3.002	115.6	64.9 − 130.84	64.9°	(341)
	B $C_{10}H_8$	Naphthalene	80.05	19,310	− 2.856	86.5	64.9 − 80.05	73.9 M % B	
1504	A $C_8H_7N_3O_5$	2, 4-Dinitroacetanilide	118.0	24,700	− 3.299	125.0	110.0 − 118.0	110.0°	(184)
	B $C_8H_8N_2O_3$	*p*-Nitroacetanilide	215.0	27,750	− 2.050	80.0	110.0 − 215.0	15.0 M % B	
1509	A $C_8H_8O_2$	Phenylacetic acid	*ca.* 77.0	16,780	− 2.504	90.65	50.0 − 77.0	21.5°	(407)
	B $C_9H_{10}O_2$	Hydrocinnamic acid	47.5	14,950	− 2.436	110.3	21.5 − 47.5	61.0 M % B	
1516	A C_8H_{10}	Xylene							(345)
	B $C_{13}H_{10}$	Fluorene	114.5	22,500	− 3.031	156.5	10.0 − 114.5		
1524	A $C_8H_{10}N_4O_2$	Caffeine	233.5	24,700	− 2.547	112.7	103.0 − 233.5	103.0°	(246)
	B $C_{11}H_{12}N_2O$	Antipyrine	110.0	22,970	− 3.133	88.72	103.0 − 110.0	37.0 M % B	
1525	A $C_8H_{11}N$	Dimethylaniline	1.9	13,970	− 2.652	66.36	− 4.5 − 1.9	−4.5°	(292)
	B $C_{13}H_{12}O$	Benzhydrol	69.0	20,370	− 3.110	150.7	− 4.5 − 69.0	13.5 M % B	
1526	A $C_8H_{11}N$	Dimethylaniline							(292)
	B $C_{17}H_{20}N_2O$	Tetramethyldiaminobenzophenone	174.0	29,000	− 3.390	219.5	110 − 174	*	
1528	A C_9H_8	Indene							(115, 346)
	B $C_{10}H_8$	Naphthalene	80.1	19,810	− 2.930	110.3	30.0 − 80.1		
1529	A C_9H_8	Indene							(345)
	B $C_{12}H_{10}$	Acenaphthene	95.0	21,990	− 3.121	132.8	30.0 − 95.0		
1530	A C_9H_8	Indene							(345)
	B $C_{13}H_{10}$	Fluorene	114.5	20,980	− 2.826	143.0	10.0 − 114.5		
1549	A $C_{10}H_7NO_2$	α-Nitronaphthalene	57.0	16,550	− 2.620	135.0	36.7 − 57.0	36.7°	(360, 369)
	B $C_{10}H_8$	Naphthalene	80.0	18,950	− 2.802	74.00	60.0 − 80.0	33.0 M % B†	
1550	A $C_{10}H_7NO_2$	α-Nitronaphthalene	56.0	15,670	− 2.488	121.0	16.1 − 56.0	16.1°	(455)
	B $C_{10}H_9N$	α-Naphthylamine	48.2	14,540	− 2.362	82.65	16.1 − 48.2	54.5 M % B	
1551	A $C_{10}H_7NO_2$	α-Nitronaphthalene	58.0	16,550	− 2.610	113.8	45.0 − 58.0	27.3°	(204)
	B $C_{10}H_{16}O$	Camphor	179.0	4,691	− 0.542	87.9	27.3 − 179.0	53.5 M % B	
1553	A $C_{10}H_8$	Naphthalene	80.0	25,850	− 3.824	88.88	61.0 − 80.0	61.0°	(82, 115, 467)
	B $C_{10}H_8O$	α-Naphthol	93.5	27,660	− 3.920	112.5	61.0 − 95.5	39.5 M % B	
1560	A $C_{10}H_8$	Naphthalene	80.1	21,730	− 3.212	94.1	7.5 − 80.1	7.5°	(282)
	B $C_{10}H_{16}$	Camphene	49.3	2,948	−0.4775	106.3	7.5 − 49.3	85.0 M % B	
1561	A $C_{10}H_8$	Naphthalene	80.1	16,270	− 2.408	84.3	32.3 − 80.1	32.3°	(100, 204)
	B $C_{10}H_{16}O$	Camphor	179.0	4,863	− 0.562	118.8	100.0 − 179.0	58.0 M % B	
1563	A $C_{10}H_8$	Naphthalene	80.09	18,560	− 2.743	83.1	39.4 − 80.09	39.4°	(467, 476)
	B $C_{12}H_{10}$	Diphenyl	68.95	16,800	− 2.567	120.3	39.4 − 68.95	56.0 M % B	
1564	A $C_{10}H_8$	Naphthalene	80.1	17,610	− 2.603	75.70	40.0 − 80.1	30.5°	(401, 467)
	B $C_{12}H_{11}N$	Diphenylamine	52.5	16,840	− 2.702	132.1	30.5 − 52.5	63.6 M % B	
1566	A $C_{10}H_8$	Naphthalene	80.1	17,380	− 2.570	77.09	55.0 − 80.1	55.0°	(345)
	B $C_{13}H_{10}$	Fluorene	114.5	18,090	− 2.438	129.7	55.0 − 114.5	36.5 M % B	
1567	A $C_{10}H_8$	Naphthalene	80.1	17,820	− 2.634	76.17	14.5 − 80.1	14.5°	(339)
	B $C_{13}H_{12}$	Diphenylmethane	25.64	18,560	− 3.248	131.3	14.5 − 25.64	75.0 M % B	
1577	A $C_{10}H_8O$	α-Naphthol	95.5	22,780	− 3.230	100	73.0 − 95.5	73.0°	(82, 467)
	B $C_{10}H_8O$	β-Naphthol	122.2	22,100	− 2.909	100	73.0 − 122.2	38.3 M % B	
1583	A $C_{10}H_8O$	α-Naphthol	93.0					90.0°	(263)
	B $C_{12}H_9N$	Carbazole	235.6	29,790	− 3.059	116.0	90.0 − 235.6	7.0 Wt. % B	
1595	A $C_{10}H_8O$	β-Naphthol	121.0					115.0°	(263)
	B $C_{12}H_9N$	Carbazole	235.5	33,360	− 3.430	116.0	135.0 − 235.5	9.0 Wt. % B	
1601	A $C_{10}H_8O$	β-Naphthol	121.0					110.0°	(406, 467)
	B $C_{14}H_{10}$	Anthracene	213.0	33,500	− 3.610	123.6	110 − 213.0	13.0 Wt. % B	
1625	A $C_{10}H_9N$	β-Naphthylamine	112.0	21,820	− 2.960	94.04	90.0 − 112.0	55.0°	(204)
	B $C_{10}H_{16}O$	Camphor	179.0	4,691	− 0.542	106.3	80.0 − 179.0	64.0 M % B	
1628	A $C_{10}H_9N$	β-Naphthylamine	111.0					98.0°	(406, 467)
	B $C_{14}H_{10}$	Anthracene	213.0	29,960	− 3.221	124.5	98.0 − 213.0	12.0 Wt. % B	
1644	A $C_{10}H_{15}NO_2S$	1-Methyl-2-sulfoneamide-4-isopropylbenzene	115.1	25,360	− 3.412	100	96.5 − 115.1	96.5°	(384)
	B $C_{10}H_{15}NO_2S$	1-Methyl-3-sulfoneamide-4-isopropylbenzene	149.9	26,890	− 3.321	100	96.5 − 149.9	33.2 M % B	
1671	A $C_{12}H_9Br$	Bromoacenaphthene	51.2	31,590	− 5.087	151.2	45.0 − 51.2	41.5°	(83)
	B $C_{12}H_{10}$	Acenaphthene	92.5	20,000	− 2.859	66.15	41.5 − 92.5	34.2 M % B	
1672	A $C_{12}H_9Cl$	Chloroacenaphthene	69.8	16,710	− 2.544	67.1	58.0 − 69.8	31.8°	(83)
	B $C_{12}H_9I$	Iodoacenaphthene	62.0	14,205	− 2.214	149.0	31.8 − 62.0	59.9 M % B‡	
1673	A $C_{12}H_9Cl$	Chloroacenaphthene	69.8					56.6°	(83)
	B $C_{12}H_{10}$	Acenaphthene	92.5	19,890	− 2.843	81.7	56.6 − 92.5	50.0 M % B§	
1674	A $C_{12}H_9I$	Iodoacenaphthene	62.0	13,400	− 2.088	182.3	45.0 − 62.0	37.6°	(83)
	B $C_{12}H_{10}$	Acenaphthene	92.5	14,205	− 2.214	149.0	50.0 − 92.5	32.8 M % B	
1678	A $C_{12}H_9N$	Carbazole	244.5	28,480	− 2.873	73.25	204.5 − 244.5	204.5°	(370)
	B $C_{18}H_{12}$	Chrysene	252.5	36,800	− 3.655	136.5	204.5 − 252.5	51.0 Wt. % B	
1680	A $C_{12}H_{10}$	Acenaphthene	95.0	20,870	− 2.961	92.8	65.7 − 95.0	65.7°	(345)
	B $C_{13}H_{10}$	Fluorene	113.5	18,560	− 2.507	107.8	65.7 − 113.5	44.3 M % B	
1686	A $C_{12}H_{10}N_2$	Azobenzene	68.0	25,880	− 3.962	91.9	35.0 − 68.0	24.5°	(345, 372)
	B $C_{12}H_{10}N_2O$	Azoxybenzene	35.0	19,530	− 3.310	108.8	24.5 − 35.0	76.8 M % B	
1687	A $C_{12}H_{10}N_2$	Azobenzene	68.5	24,310	− 3.719	98.93	60.0 − 68.5	60.0°	(372, 475)
	B $C_{12}H_{12}N_2$	Hydrazobenzene	131.0	23,620	− 3.053	101.1	75.0 − 131.0	19.5 M % B	

* 5.0 M % B at 30.0°, 7.5 M % B at 50°, 15.0 M % B at 80°.

† 52.0 M % B at 50.0°.

‡ 53.4 M % A at 40.0°.

§ 20.0 M % B at 63.0°.

Equations.—(*Continued*)

No.	Formula	Name	M. P.	a	b	c	Range, °C	Eut. temp. and %	Lit.
1695	A $C_{12}H_{10}N_2$	Azobenzene	68.5					60.0°	(374)
	B $C_{14}H_{14}N_2$	*p*-Azotoluene	144.0	26,600	− 3.333	115.4	75.0 − 144.0	13.2 M % B	
1731	A $C_{13}H_{10}O_3$	Salol	42.5	16,360	− 2.709	81.05	32.5 − 42.5	32.5°	(335)
	B $C_{17}H_{12}O_3$	Betol	92.0	25,930	− 3.712	123.4	32.5 − 92.0	19.0 M % B	
1750	A $C_{14}H_{10}$	Anthracene	216.5	34,180	− 3.651	78.1	193.5 − 216.5	193.5°	(370)
	B $C_{18}H_{12}$	Chrysene	252.5	35,720	− 3.552	128.2	193.5 − 252.5	40.0 Wt. % B	
1757	A $C_{14}H_{10}O_2$	Benzil	95.0	26,910	− 3.802	99.06	86 − 95	86.0°	(37, 464)
	B $C_{14}H_{12}O_2$	Benzoin	134.0	41,000	− 5.255	101.0	86 − 134	19.9 M % B	
1799	A $C_{16}H_{32}O_2$	Palmitic acid	60.3	48,250	− 7.560	66.30	57.0 − 60.3	57.0°	(361)
	B $C_{27}H_{46}O$	Cholesterol	147.0	22,780	− 2.832	150.9	57.0 − 147.0	16.7 M % B	
1800	A $C_{16}H_{32}O_2$	Palmitic acid	61.0	37,520	− 5.870	31.74	54 − 61.0	54.0°	(246.5)
	B $C_{51}H_{98}O_6$	Tripalmitin	62.0	157,900	−24.60	315.0	54 − 62.0	25.0 M % B	
1827	A $C_{18}H_{34}O_2$	Oleic acid	6.5					5.0°	(361)
	B $C_{27}H_{46}O$	Cholesterol	147.0	22,780	− 2.832	136.9	60 − 147	15.0 M % B	
1830	A $C_{18}H_{36}O_2$	Stearic acid	68.5	59,750	− 9.135	73.55	65 − 68.5	65.0°	(361)
	B $C_{27}H_{46}O$	Cholesterol	147.0	22,780	− 2.832	136.0	65 − 147	20.5 M % B	
1831	A $C_{18}H_{36}O_2$	Stearic acid	67.5	48,260	− 7.400	35.24	57 − 67.5	57.0°	(246.5)
	B $C_{51}H_{98}O_6$	Tripalmitin	62.0	164,600	−25.65	283.8	57 − 62	42.0 M % B	
1833	A $C_{19}H_{16}$	Triphenylmethane	91.0	13,930	− 1.998	93.9	78.5 − 91.0	78.5°	(251)
	B $C_{19}H_{16}O$	Triphenyl carbinol	160.0	28,850	− 3.480	106.5	78.5 − 160.0	15.5 M % B	

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(130) Giua, *36*, **45 I**: 557; 15. (131) Giua, *36*, **45 II**: 32; 15. (132) Giua, *36*, **45 II**: 348; 15. (133) Giua, *36*, **46 I**: 289; 16. (134) Giua, *36*, **46 I**: 272; 16. (135) Giua, *36*, **47 I**: 57; 17. (136) Giua, *36*, **47 I**: 74; 17. (137) Giua and Angeletti, *36*, **51 I**: 318; 21. (138) Giua and Cherchi, *36*, **49 II**: 264; 19. (139) Giua, Marcellino and Curti, *36*, **50 II**: 300; 20.

(140) Gomberg and Schoepfle, *1*, **41**: 1655; 19. (141) Tsakalotos and Guye, *42*, **8**: 340; 10. (142) Groschuff, *9*, **17**: 348; 11. (143) von Halban, *7*, **84**: 129; 13. (144) von Halban and Hecht, *9*, **24**: 65; 18. (145) Harding, *4*, **119**: 260; 21. (146) Hartley and Stuart, *4*, **105**: 309; 14. (147) Hartley and Thomas, *4*, **89**: 1013; 06. (148) Hartogs, *Thesis*, Amsterdam, 33; 1910. (149) Harvey and Back, *173*, **46**: 188; 21.

(150) Hasselblatt, *7*, **83**: 1; 13. (151) Hatcher and Skirrow, *1*, **39**: 1939; 17. (152) Heintz, *8*, **92**: 288; 54. (153) Henstock, *4*, **121**: 2124; 22. (154) Herz and Rathmann, *9*, **19**: 552; 13. (155) Herz and Rathmann, *9*, **19**: 887; 13. (156) Hetherington and Braham, *45*, **15**: 1060; 23. (157) Hildebrand, *1*, **39**: 2297; 17. (158) Hildebrand, Ellefson and Beebe, *1*, **39**: 2301; 17. (158.1) Hill and Mosbachev, *1*, **47**: 2544; 25. (159) Hoeflake, *70*, **40**: 488; 21.

(160) Holleman, *70*, **19**: 364; 00. (161) Holleman, *70*, **19**: 188; 00. (162) Holleman, *70*, **20**: 352; 01. (163) Holleman, *70*, **20**: 206; 01. (164) Holleman, *70*, **22**: 263; 03. (165) Holleman, *70*, **23**: 357; 04. (166) Holleman, *70*, **24**: 140; 05. (167) Holleman, *70*, **25**: 183; 06. (168) Holleman and Euwes, *70*, **27**: 153; 08. (169) Holleman, *70*, **27**: 458; 08.

(170) Holleman, *70*, **28**: 408; 09. (171) Holleman, *70*, **32**: 134; 13. (172) Holleman, *70*, **33**: 183; 14. (173) Holleman, Vermeulen and Mooy, *70*, **33**: 1; 14. (174) Holleman, *70*, **34**: 204; 15. (175) Holleman, *64V*, **17**: 569; 08. (176) Holleman and Antusch, *70*, **13**: 277; 94. (177) Holleman and van den Arends, *70*, **28**: 408; 09. (178) Holleman and de Bruijn, *70*, **19**: 79; 00. (179) Holleman and Caland, *25*, **44**: 2504; 11.

(180) Holleman, Hartogs and van der Linden, *25*, **44**: 704; 11. (181) Holleman and van der Linden, *70*, **30**: 304; 11. (182) Holleman and Pollak, *70*, **29**: 416; 10. (183) Holleman and Rinkes, *70*, **30**: 48; 11. (184) Holleman and Sluiter, *70*, **25**: 208; 06. (185) Holleman, Vermeulen and Mooy, *70*, **33**:

1; 14. (186) Hollmann, *7*, **43**: 129; 03. (187) Holm, *Diss.*, Amsterdam, 1921. (188) Hope and Riley, *4*, **123**: 2470; 23. (188.5) Hope and Riley, *4*, **121**: 2510; 22. (189) Isaac, *5*, **84**: 344; 10.

(190) Isaac, *5*, **88**: 205; 13. (191) van Iterson-Rotgans, *176*, **10**: 920; 13. (192) van Iterson-Rotgans, *7*, **87**: 305; 14. (193) Jaeger, *94*, **38**: 553; 04. (194) Jaeger, *94*, **40**: 113; 05. (195) Jaeger, *94*, **42**: 236; 06. (196) Jaeger, *64P*, **7**: 658; 05. (197) Jaeger, *64P*, **8**: 614; 06. (198) Jaeger, *64P*, **10**: 436; 08. (199) Jaeger, *70*, **26**: 311; 07.

(200) Jaeger, *Diss.*, Leiden, 1903. (201) Jaeger and van Kregten, *64P*, **14**: 729; 12. (202) Jaeger and van Kregten, *64V*, **20**: 700; 12. (203) James, Jones and Lewis, *4*, **117**: 1273; 20. (204) Jouniaux, *27*, **11**: 129; 12. (205, 206) Jouniaux, *27*, **11**: 546; 12. (207) Kachler, *27*, **13**: 460; 70. (207.5) Kanolt, U. S. Bur. Stands., *0*. (208) Kendall, *1*, **36**: 1222; 14. (209) Kendall, *1*, **36**: 1722; 14.

(210) Kendall, *1*, **38**: 1309; 16. (211) Kendall and Adler, *1*, **43**: 1470; 21. (212) Kendall and Booge, *1*, **38**: 1712; 16. (213) Kendall and Gibbons, *1*, **37**: 149; 15. (214) Kettner, *Diss.*, Amsterdam, 1919. (215) King and Orton, *4*, **99**: 1377; 11. (216) Klobbie, *7*, **14**: 615; 97. (217) de Koch, *7*, **48**: 129; 04. (218) Koopal, *70*, **34**: 115; 15. (219) Kremann, *75*, **113, II b**: 809; 04.

(220) Kremann, *75*, **113, II b**: 905; 04. (221) Kremann, *75*, **113, II b**: 1085; 04. (222) Kremann, *75*, **113, II b**: 864; 04. (223) Kremann, *75*, **114, II b**: 1201; 05. (224) Kremann, *75*, **115, II b**: 427; 06. (225) Kremann, *75*, **115, II b**: 1087; 06. (226) Kremann, *75*, **116, II b**: 1031; 07. (227) Kremann, *323*, **58**: 663; 08. (228) Kremann, *75*, **117, II b**: 569; 08. (229) Kremann, *75*, **119, II b**: 657; 10.

(230) Kremann, *75*, **120, II b**: 329; 11. (231) Kremann and Auer, *57*, **39**: 441; 18. (232) Kremann and Csanyi, *57*, **37**: 755; 16. (233) Kremann and Dietrich, *57*, **44**: 151; 23. (234) Kremann and Dietrich, *57*, **44**: 175; 23. (234.1) Kremann and Drazil, *57*, **45**: 345; 24. (235) Kremann and Fritsch, *57*, **41**: 631; 20. (236) Kremann, Geba and Moss, *75*, **119, II b**: 669; 10. (237) Kremann and Grasser, *57*, **37**: 723; 16. (238) Kremann and Haas, *57*, **40**: 155; 19. (239) Kremann and Haas, *57*, **40**: 189; 19.

(240) Kremann, Hemmelmayr and Riemer, *57*, **43**: 164; 22. (241) Kremann and Hofmeier, *75*, **119, II b**: 121; 10. (242) Kremann and Hohl, *57*, **41**: 613; 20. (243) Kremann, Hohl and Müller, *57*, **42**: 199; 21. (244) Kremann, Hönigstreg and Mauermann, *57*, **44**: 65; 23. (245) Kremann and Janetsky, *57*, **33**: 1055; 12. (246) Kremann and Janetzky, *57*, **44**: 49; 23. (246.5) Kremann and Klein, *57*, **34**: 1291; 13. (246.7) Kremann and Kropsch, *57*, **35**: 563, 823, 841; 14. (247) Kremann, Lupfer and Zodowsky, *57*, **41**: 499; 20. (248) Kremann and Marktl, *57*, **41**: 1; 20. (249) Kremann and Marktl, *57*, **41**: 43; 20.

(250) Kremann and Mauermann, *57*, **43**: 315; 22. (251) Kremann, Mauermann, Müller and Rösler, *57*, **43**: 321; 22. (252) Kremann and Müller, *57*, **42**: 181; 21. (253) Kremann and Odelga, *57*, **42**: 147; 21. (254) Kremann, Odelga and Zadowsky, *57*, **42**: 117; 21. (255) Kremann, Mauermann and Oswald, *57*, **43**: 335; 22. (256) Kremann and Petrischek, *57*, **38**: 385; 17. (257) Kremann and Petrischek, *57*, **38**: 405; 17. (258) Kremann and Pogantsch, *57*, **44**: 163: 23. (259) Kremann and Rodenis, *57*, **27**: 125; 06.

(260) Kremann and Schadinger, *57*, **39**: 833; 18. (261) Kremann and Schadinger, *57*, **40**: 35; 19. (261.5) Kremann and Schoulz, *57*, **33**: 1063; 12. (262) Kremann and Slovak, *57*, **41**: 5; 20. (263) Kremann and Slovak, *57*, **41**: 23; 20. (264) Kremann and Strohschneider, *57*, **39**: 505; 18. (265) Kremann and Strzelba, *57*, **42**: 167; 21. (266) Kremann, Sutter, Sitte, Strzelba and Dobotsky, *57*, **43**: 269; 22. (267) Kremann and Wenzing, *57*, **38**: 479; 17. (268) Kremann, Wischo and Paul, *57*, **36**: 911; 15. (269) Kremann and Wlk, *57*, **40**: 57; 19.

(270) Kremann and Wlk, *57*, **40**: 205; 19. (271) Kremann and Wlk, *57*, **40**: 237; 19. (272) Kremann and Zadowsky, *57*, **41**: 543; 20. (273) Kremann and Zechner, *57*, **39**: 777; 18. (274) Kremann and Zechner, *57*, **39**: 807; 18. (274.1) Kremann, Zechner and Drazil, *57*, **45**: 355; 24. (274.2.) Kremann, Zechner and Weber, *57*, **45**: 305; 24. (275) Jaeger and van Kregten, *64V*, **20**: 700; 12. (276) Kroeber, *7*, **93**: 641; 19. (277) Kruyt, *7*, **79**: 657; 12. (278) Kurilov, *7*, **23**: 547; 97. (279) Kurilov, *7*, **24**: 441; 97.

(280) Kurnakov and Efremov, *53*, **44**: 1992; 12. (281) Kurnakov and Efremov, *53*, **45**: 1295, 1992; 13. (282) Kurnakov and Efremov, *169*, **18**: 105; 12. (283) Kurnakov, Krotkov and Oksman, *53*, **47**: 558; 15. (284) Kurnakov and Kivjat, *169*, **20**: 664; 13. *10*, **4**: 214; 21. (285) Kurnakov and Kivjat, *53*, **46**: 1372; 14. *7*, **88**: 401; 14. (286) Kurnakov and Solovev, *53*, **48**: 1338; 16. (287) Küster, *7*, **5**: 601; 90. (288) Küster, *7*, **8**: 577; 91. (289) Küster and Würfel, *7*, **50**: 65; 04.

(290) Ladenburg and Sobecki, *25*, **43**: 2374; 10. (291) Lafortune, *28*, **32**: 314; 23. (292) Lang, *Diss.*, Zurich, 75; 12. (293) van der Laar, *70*, **26**: 1; 07. (294) Lautz, *7*, **84**: 611; 13. (295) Laws and Sidgwick, *4*, **99**: 2085; 11. (296) Lehmann, *136*, **38**: 388; 14. (297) Lehmann, *136*, **38**: 402; 14. (298) Lehmstedt, *245*, **13**: 118; 18. (299) Leopold, *7*, **66**: 359; 09.

(300) Lewis and Brighton, *1*, **40**: 482; 18. (301) Lidbury, *7*, **39**: 453; 02. (302) van der Linden, *25*, **45**: 231; 12. (303) van der Linden, *64V*, **20**: 218; 11. (304) Hartogs and van der Linden, *64V*, **19**: 1070; 11. (305) Linebarger, *1*, **15**: 45; 93. (306) Lloyd, *50*, **22**: 300; 18. (307) Maarse, *Diss.*, Amsterdam, 1913. (308) Maarse, *70*, **33**: 207; 14. (309) Macleod, Pfund and Kilpatrick, *1*, **44**: 2260; 22.

(310) Cohen and Moesveld, *7*, **93**: 385; 19. (311) Mameli, *172*, **10**: 157; 09. (312) Mameli and Cocconi, *36*, **52 II**: 113; 22. (313) Mameli and Cocconi, *36*, **53**: 149; 23. (314) Mameli and Mannessier, *Boll. della soc. medico-chirugica, Pavia*, **1912**: 17. (315) Mameli and Mannessier, *36*, **43 II**: 586; 13. (316) Marden and Dover, *1*, **39**: 1; 17. (317) Mascarelli, *22*, **17 I**: 29; 08. (318) Mascarelli, *36*, **39 I**: 251; 09. (319) Mascarelli and Ascoli, *36*, **37 I**: 125; 07.

(320) Mascarelli and Babini, *36*, **41 I**: 89; 11. (321) Mascarelli and Constantino, *36*, **40 I**: 31; 10. (322) Mascarelli and Musatty, *36*, **41 I**: 103; 11. (323) Mascarelli and Pestalozza, *22*, **16 II**: 567; 07. (324) Mascarelli and Pestalozza, *22*, **17 I**: 601; 08. (325) Mascarelli and Pestalozza, *36*, **38 I**: 38; 08. (326) Mascarelli and Pestalozza, *36*, **39 I**: 218; 09. (327) Mascarelli and Sanna, *36*, **45 II**: 329; 15. (328) Mascarelli and Sanna, *22*, **24 II**: 91; 15. (329) Meldrum, *135*, **108**: 199; 13.

(330) Menschutkin, *53*, **45**: 1701; 13. (331) Menschutkin, *169*, **16**: 78; 12. (332) Meyer and Beer, *57*, **34**: 1195; 13. (333) Meyer, Brod and Soyka, *57*, **34**: 1113; 13. (334) Meyer, R. and Meyer, W., *25*, **52**: 1249; 19. (335) Miers and Isaac, *5*, **79**: 322; 07. (336) Miers and Isaac, *62*, **209 A**: 337; 08. (337) Miers and Isaac, *4*, **93**: 927; 08. (338) Mills, Parker and Prowse, *4*, **105**: 1537; 14. (339) Miolati, *7*, **9**: 649; 92.

(340) Mlodziejowski, *96*, **20**: 317; 23. (341) Monroe, *45*, **11**: 1116; 19. (341.5) Cohen and Moesveld, *7*, **93**: 385; 19. (342) Morrell and Hanson, *4*, **85**: 1520; 04. (343) Morgan and Challenor, *4*, **119**: 1537; 21. (344) Mortimer, *1*, **45**: 633; 23. (345) Mortimer, *0*. (346) Muchin, *9*, **18**: 757; 12. (347) McKie, *4*, **113**: 799; 18. (348) McKie, *4*, **119**: 777; 21. (349) Nagornov, *7*, **75**: 578; 11.

(350) Narbutt, *7*, **53**: 697; 05. (351) Nichols, *1*, **40**: 400; 18. (351.5) Nichols, *50*, **28**: 769; 24. (352) Noelting, *6*, **19**: 476; 10. (353) O'Connor, *4*, **119**: 400; 21. (353.1) O'Connor, *4*, **125**: 1422; 24. (354) Olivari, *73*, **3**: 90; 11. (354.5) Orton and Owen, *4*, **125**: 766; 24. (355) Owen, *4*, **123**: 3392; 23. (356) Padoa, *22*, **13 I**: 723; 04. (357) Padoa, *22*, **13 II**: 31; 04. (358) Padoa and Rotondi, *22*, **21 II**: 626; 12. (359) Page and Heasman, *4*, **123**: 3247; 23.

(360) Palazzo and Batelli, *23*, **19**: 514; 83. (361) Partington, *4*, **99**: 313; 11. (362) Pascal, *34*, **154**: 883; 12. (363) Pascal, *34*, **177**: 587; 23. (364) Pascal, *27*, **13**: 744; 13. (365) Pascal, *27*, **11**: 1030; 12. (366) Pascal, *27*, **11**: 321; 12. (367) Pascal, *27*, **11**: 595; 12. (368) Pascal, *27*, **15**: 451; 14. (369) Pascal, *27*, **24**: 388; 20.

(370) Pascal, *27*, **29**: 644; 21. (371) Pascal, *27*, **33**: 170; 23. (372) Pascal and Normand, *27*, **13**: 151; 13. (373) Pascal and Normand, *27*, **13**: 207; 13. (374) Pascal and Normand, *27*, **13**: 878; 13. (375) Paterno and Ampola, *36*, **27 I**: 481; 97. (376) Paterno and Mieli, *36*, **37 II**: 330; 07. (377) Paterno and Montemartini, *36*, **24 II**: 208; 94. (378) Paterno and Salimei, *36*, **43 II**: 245; 13. (379) Pavlevski, *180*, **6**: 379; 93. (379.5.) Pavlevski, *25*, **30**: 2805; 98.

(380) Petrie, *54*, **38**: 1327; 19. (381) Philip, *4*, **83**: 814; 03. (382) Philip, *4*, **103**: 284; 13. (383) Philip and Smith, *4*, **87**: 1735; 05. (384) Phillip, *1*, **46**: 686; 24. (385) Pickering, *4*, **63**: 998; 93. (386) Plotnikov, *53*, **47**: 1062; 15. (387) Plotnikov, *53*, **47**: 2060; 15. (388) Holleman and Polak, *70*, **29**: 416; 10. (389) Poma, *36*, **41 I**: 518; 11.

(390) Prins, *7*, **67**: 689; 09. (391) Pratolongo, *22*, **23 I**: 46; 14. (392) Pushin and Fioletova, *4*, **121**: 2822; 22. (393) Pushin and Grebenschikov, *53*, **45**: 741; 13. (394) Pushin and Grebenschikov, *183*, **8**: 165; 13. (395) Pushin and Mazarovich, *183*, **10**: 205; 14. *10*, **4**: 214; 21. (396) Pushin and Mazarovich, *53*, **46**: 1366; 14. (397) Reimer and Gatewood, *1*, **42**: 1475; 20. (398) McKie, *4*, **113**: 799; 18. (399) Rhodes and Hance, *50*, **25**: 491; 21.

(400) Robert, *27*, **25**: 463; 19. (401) Roloff, *7*, **17**: 325; 95. (402) von Romburgh, *64V*, **18**: 175; 09. (403, 404) Rothmund, *7*, **26**: 433; 98. (405) Rózsa, *9*, **17**: 934; 11. (406) Rudolfi, *7*, **66**: 705; 09. (407) Salkovski, *25*, **18**: 321; 85. (408) Sanderson and Jones, *54*, **39**: 8; 20. (409) Saposchnikov, Rdultovskii and Gelvich, *53*, **35**: 1072; 03.

(410, 411) Saposchnikov, *7*, **49**: 688; 04. (412) Saposchnikov and Rdultovskii, *53*, **35**: 1073; 03. (413) Scheuer, *7*, **72**: 513; 10. (414) Schmidlin and Lang, *25*, **43**: 2806; 10. (415) Schmidlin and Lang, *25*, **45**: 899; 12. (416) Schreinemakers, *7*, **25**: 543; 98. (417) Schreinemakers, *7*, **26**: 237; 98. (418) Schreinemakers, *7*, **29**: 577; 99. (419) Schroeder, *7*, **11**: 449; 93.

(420) Senden, *28*, **32**: 97; 23. (420.5) Laws and Sidgwick, *4*, **99**: 2085; 11 (421) Sidgwick, *4*, **107**: 672; 15. (422) Sidgwick and Allot, *4*, **123**: 2819; 23. (423) Sidgwick and Aldous, *4*, **119**: 1001; 21. (423.5) Sidgwick and Callow, *4*, **125**: 527; 24. (424) Sidgwick and Clayton, *4*, **121**: 2263; 22. (425) Sidgwick and Dash, *4*, **121**: 2586; 22. (426) Sidgwick and Ewbank, *4*, **119**: 979; 21. (426.1) Sidgwick and Neill, *4*, **123**: 2813; 23. (427) Sidgwick and Rubie, *4*, **119**: 1013; 21. (428) Sidgwick, Spurrell and Davies, *4*, **107**: 1202; 15. (429) Sidgwick and Turner, *4*, **121**: 2256; 22.

(430) Simpson and Jones, *54*, **38**: 325; 19. (431) Smith and Watts, *4*, **97**: 562; 10. (432) Smits, *64P*, **23**: 679; 21. (433) Smits and Berckmans, *64P*, **21**: 401; 18. (434) Smits and Berckmans, *64V*, **27**: 163; 18. (435) Smits and de Leeuw, *87*, **19**: 283; 10. (436) Speyers, *12*, **14**: 293; 02. (437) Stobbe, *25*, **44**: 1481; 11. (438) Sudborough and Beard, *4*, **97**: 773; 10. (439) Sudborough and Beard, *4*, **99**: 209; 11.

(440) Sudborough and Lakhumalani, *4*, **111**: 41; 17. (441) Tausz and Schnabel, *136*, **43**: 726; 19. (442) Taylor and Rinkenbach, *1*, **45**: 44; 23. (443)

Taylor and Rinkenbach, *1*, **45**: 104; 23. (444) Taylor and Rinkenbach, *1*, **45**: 1218; 23. (444.1) Taylor and Rinkenbach, Bureau of Mines, Pittsburgh, Pa., *0*. (445) Taylor and Rinkenbach, *45*, **15**: 73; 23. (446) Taylor and Rinkenbach, *45*, **15**: 795; 23. (447) Taylor and Rinkenbach, *45*, **15**: 1070; 23. (447.1) Thiel and Schulte, *7*, **96**: 312; 20. (448) Chaumeil and Thomas, *34*, **176**: 1323; 23. (449) Roche and Thomas, *34*, **176**: 586; 23.

(450) Timmermans, *7*, **58**: 129; 07. (451) Timmermans, *Diss.*, Brussels, 1911. (452) Timofeev, *Diss.*, Kharkoff, 1894. (453) Tinkler, *4*, **103**: 2171; 13. (454) Fischer and Gröppel, *93*, **30**: 76; 17. (455) Tsakalotos, *27*, **11**: 284; 12. (456) Tsakalotos, *27*, **13**: 281; 13. (457) Tsakalotos, *49*, **12**: 355; 15. (458) Tsakalotos and Guye, *42*, **8**: 340; 10. (459) Turner and English, *4*, **105**: 1786; 14.

(460) Tyrer, *4*, **97**: 1778; 10. (461) Valeton, *64V*, **18**: 755; 10. (462) Vanstone, *4*, **95**: 590; 09. (463) Vanstone, *4*, **103**: 1826; 13. (464) Vanstone, *133*, **1913**: 426. (465) Vasiliev, *Diss.*, Kazani, 1917. (466) Vermeulen, *Diss.*, Amsterdam, 1914. (467) Vignon, *27*, **6**: 387; 656; 91. (468) Viala, *27*, **15**: 5; 14. (469) de Visser, *70*, **17**: 182; 98.

(470) Voano, *53*, **48**: 76; 16. (471) Wadsworth, *173*, **45**: 133; 20. (472) Waentig and Pescheck, *7*, **93**: 529; 19. (473) Wahl, *5*, **87**: 152; 12. (474) Wahl, Normand and Vermeylen, *34*, **174**: 946; 22. (475) Ward, *50*, **30**: 1316; 26. (476) Washburn and Read, *197*, **1**: 191; 15. (477) Weiss and Downs, *1*, **45**: 1003; 23. (478) Wheeler, *1*, **42**: 1842; 20. (479) Wibaut, *70*, **32**: 244; 13.

(480) Wibaut, *70*, **32**, 244; 13. (481) Wood and Scott, *4*, **97**: 1573; 10. (482) Wroczynski and Guye, *42*, **8**: 189; 10. (483) Yamanato, *44*, **25**: 123; 08. (484) Disselhamp, *7*, **123**: 99; 26.

CRYOSCOPIC DATA, ORGANIC SOLVENTS

$k_F (= \Delta t/N)$ is the molal lowering for a normal solute in dilute solution in the solvent, as deduced from the freezing-point data. N = moles of solute per 1000 grams of solvent.

The latent heat of fusion of the solvent in g-cal/g is given by $l = \dfrac{1.99 T_F^2}{1000 k_F}$, where T_F is the freezing point of the pure solvent on the absolute scale.

ℭ-Table

The ℭ-Arrangement

Solvent		k_F	Lit.
Formula	Name		
CCl_4	Carbon tetrachloride	29.80–34.8	(14, 50)
CS_2	Carbon disulfide	3 83	(14)
$CHBr_3$	Bromoform	14.25–14.435	(1, 102); *cf.* (100)
$CHCl_3$	Chloroform	4.67–4.90	(10, 14)
CH_2I_2	Methylene iodide	14.40	(42)
	(Stable)	14.40	(9)
	(Metastable)	13.70	(9)
CH_2N_2	Cyanamide	*ca.* 3.0	(90)
CH_2O_2	Formic acid	2.770–2.80	(92, 101, 106)
CH_3NO	Formamide	3.20–3.85	(30, 105)
$C_2H_2Br_4$	Tetrabromoacetylene	21.70	(57)
$C_2H_3Br_3O_2$	Bromal hydrate	11.04	(13)
$C_2H_3ClO_2$	Monochloroacetic acid	5.211	(59)
	(Stable)	4.85	(95)
	(Metastable)	4.88	(95)
	α-Monochloroacetic acid	5.241	(60)
	β-Monochloroacetic acid	5.167	(60)
C_2H_4BrCl	Bromochloroethane	8.63	(50)
$C_2H_4Br_2$	Ethylene dibromide (M. P., 9.975 dry)	12.50–11.80	(19, 61, 73, 92)
$C_2H_4O_2$	Acetic acid	3.90	(15, 30, 61, 77, 92, 101)
C_2H_5NO	Acetamide	3.63	(30)
$C_2H_5NO_2$	Methyl carbamate	4.49	(36)
C_3HCl_7	Heptachloropropane (*asym.*)	12.0	(16)
$C_3H_5N_3O_9$	Nitroglycerine	7.5 *ca.*	(54)
C_3H_7NO	Acetoxime	5.56	(36)
$C_3H_7NO_2$	Urethane	5.00–5.14	(30, 36, 101)
$C_4H_4N_2$	Succinonitrile	18.26	(26)
$C_4H_4O_3$	Succinic anhydride	6.30	(46)
$C_4H_6O_2$	α-Crotonic acid	6.50	(46)
$C_4H_6O_4$	Dimethyl oxalate	5.00	(7)
$C_4H_7Cl_3O_2$	Chloral alcoholate	8.06	(36)
$C_4H_9NO_2$	Methylurethane	4.85	(96)
$C_4H_{10}O$	*tert.*-Butyl alcohol	12.80	(4)

ℭ-Table.—(*Continued*)

Solvent		k_F	Lit.
Formula	Name		
$C_4H_{10}O$	Ether	1.79	(14)
C_5H_5N	Pyridine	4.97	(14)
C_6Cl_6	Hexachlorobenzene	20.75	(62)
$C_6H_3Br_3O$	2, 4, 6-Tribromophenol	20.40	(28)
$C_6H_3Cl_3$	1, 3, 5-Trichlorobenzene	8.70	(28)
C_6H_4BrCl	*p*-Bromochlorobenzene	9.20–9.99	(6, 24, 48)
$C_6H_4BrNO_2$	*o*-Bromonitrobenzene	9.10	(52)
	m-Bromonitrobenzene	8.75	(52)
	p-Bromonitrobenzene	11.53	(52)
$C_6H_4Br_2$	*p*-Dibromobenzene	11.57–12.40	(6, 8, 24, 29)
$C_6H_4ClNO_2$	*o*-Chloronitrobenzene	7.50	(52)
	m-Chloronitrobenzene	6.07	(52)
	p-Chloronitrobenzene	10.80–10.90	(6, 30)
$C_6H_4Cl_2$	*p*-Dichlorobenzene	7.22–7.70	(6, 8, 24, 29, 48, 50)
$C_6H_4N_2O_4$	*m*-Dinitrobenzene	10.60	(6)
C_6H_5BrO	*p*-Bromophenol	10.8	(38)
C_6H_5ClO	*o*-Chlorophenol	7.72	(52)
	m-Chlorophenol	8.30	(52)
	p-Chlorophenol	8 58	(52)
$C_6H_5NO_2$	Nitrobenzene (M. P., 5.67)	6.89–7.10	(6, 17, 29, 48, 50, 92, 93)
	(M. P. 5.82)	8.10	(12)
$C_6H_5NO_3$	*o*-Nitrophenol	7.5	(97)
	m-Nitrophenol	7.80	(97)
	p-Nitrophenol	8.60	(97)
C_6H_6	Benzene	4.90–5.23	(8, 31, 38, 46, 50, 51, 61, 66, 71, 79, 84, 85, 88, 92, 98, 99, 100, 104)
$C_6H_6Cl_6$	α-*trans*-Benzene hexachloride	16.50	(62)
C_6H_6O	Phenol	7.20–7.50	(30, 35, 36, 46, 101, 103)
$C_6H_6O_2$	*o*-Dihydroxybenzene	7.13	(52)
$C_6H_6O_2$	Resorcinol	6.50	(41)
C_6H_7N	Aniline	5.87	(2)
$C_6H_8N_2$	Phenylhydrazine	5.859	(74)
$C_6H_{10}O_4$	Dimethyl succinate	5.55	(19, 23, 28)
C_6H_{12}	Cyclohexane	20.00–20.30	(50, 63, 85, 66)
$C_6H_{12}O$	Cyclohexanol	3.828	(39); *cf.* (96.5)
$C_6H_{12}O_3$	Paraldehyde	7.05	(58)
$C_7H_5NO_3$	*p*-Nitrobenzaldehyde	7.0 *ca.*	(25)
$C_7H_5N_3O_6$	2, 4, 6-Trinitrotoluene	11.50	(6)
$C_7H_6N_2O_4$	2, 4-Dinitrotoluene	8.90	(6)
$C_7H_6O_2$	Benzoic acid	7.85–8.788	(46, 72)
C_7H_7Br	*p*-Bromotoluene	8.20–8.55	(8, 29, 48, 50, 82)
C_7H_7Cl	*p*-Chlorotoluene	5.60	(8)
C_7H_7I	*p*-Iodotoluene	10.0–11.30	(8, 29)
C_7H_7NO	Benzamide	9.65	(62)
$C_7H_7NO_2$	*o*-Nitrotoluene (stable)	7.18	(78)
	(Metastable)	5.08	(78)
	m-Nitrotoluene	6.78–6.84	(52, 96)
	p-Nitrotoluene	7.80	(6, 8)
C_7H_8O	*o*-Cresol	5.62	(34)
	p-Cresol	7.55	(36)
$C_7H_8O_2$	2, 6-Dimethylpyrone	6.46	(89)
C_7H_9N	*p*-Toluidine	5.10–5.37	(8, 28, 35, 36, 101)
$C_8H_6N_2$	Quinoxaline	8.90	(79)
$C_8H_7BrO_2$	Methyl *p*-bromobenzoate	8.40	(29)
C_8H_8O	Acetophenone	5.65	(46)
$C_8H_8O_2$	Phenylacetic acid	9.00	(25)
C_8H_9NO	Acetanilide	6.932	(72)
C_8H_{10}	*p*-Xylene	4.30	(8, 41, 66, 79, 87)
$C_8H_{10}O_2$	*o*-Dimethoxybenzene	6.38–6.40	(19, 83)
$C_8H_{11}N$	Dimethylaniline	5.80	(3)
$C_9H_8O_2$	Cinnamic acid	*ca.* 9.4–10.00	(37, 72)
$C_9H_9NO_4$	Ethyl *o*-nitrobenzoate	7.40	(22)
$C_9H_{10}N_2O_3$	*m*-Nitro-*p*-acettoluide (stable)	8.7	(95)
	(Metastable)	9.905	(95)
$C_9H_{10}O_2$	Methyl *p*-toluate	6.20	(8)
$C_9H_{10}O_2$	Phenylpropionic acid	8.87–8.95	(23, 36)

$\mathfrak{C}$-Table.—(*Continued*)

Solvent Formula	Solvent Name	k_F	Lit.
$C_{10}H_7Br$	β-Bromonaphthalene	12.40	(29)
$C_{10}H_7Cl$	β-Chloronaphthalene	9.76	(29)
$C_{10}H_7I$	β-Iodonaphthalene	15.00	(29)
$C_{10}H_7NO_2$	α-Nitronaphthalene	9.10	(29)
$C_{10}H_8$	Naphthalene	6.899–7.10	(5, 6, 7, 34, 35, 47, 48, 50, 72, 79, 103)
$C_{10}H_8O$	β-Naphthol	11.25	(18)
$C_{10}H_9N$	α-Naphthylamine	7.80–7.90	(28, 35)
$C_{10}H_{10}O_2$	Methyl cinnamate	7.10	(27)
$C_{10}H_{10}O_3$	Ethyl o-aldehydobenzoate	6.05	(27)
$C_{10}H_{12}O$	p-Anethole	6.12–6.22	(36, 46)
$C_{10}H_{14}O$	Thymol	8.30–8.32	(36, 43)
$C_{10}H_{15}BrO$	d-Bromocamphor	11.87	(81)
$C_{10}H_{16}O$	Camphor	49.80	(55, 56)
$C_{10}H_{16}O$	Fenchone	6.81	(53)
$C_{10}H_{18}O$	Cineole	6.70	(38)
$C_{10}H_{20}O$	Menthol	12.40	(43)
$C_{10}H_{20}O_2$	Capric acid	4.73	(36)
$C_{12}H_9N$	Carbazole	12.30	(40)
$C_{12}H_{10}$	Diphenyl	8.00–8.35	(36, 46, 79)
$C_{12}H_{10}N_2$	Azobenzene	8.25–8.35	(32, 36)
$C_{12}H_{10}N_2O$	Azoxybenzene	8.50	(27)
$C_{12}H_{10}O$	Diphenyl ether	8.00	(33)
$C_{12}H_{11}N$	Diphenylamine	8.40–8.80	(25, 35, 101)
$C_{12}H_{14}O_4$	Isoapiol	8.00	(46)
$C_{12}H_{18}N_4O$	Phenylhydrazine hydrate	4.415	(75)
$C_{12}H_{18}O_8$	Diethyl diacetyl-d-tartrate	13.32	(85, 86)
$C_{12}H_{22}$	Dicyclohexyl	14.52	(70)
$C_{12}H_{24}O_2$	Lauric acid	4.40	(35)
$C_{13}H_{10}O$	Benzophenone	9.88	(36)
$C_{13}H_{10}O_2$	Phenyl benzoate	8.00	(45)
$C_{13}H_{10}O_3$	Salol	12.30	(45)
$C_{13}H_{12}$	Diphenylmethane	6.60–6.72	(25, 36, 64)
$C_{13}H_{12}N_2$	Benzaldehyde phenylhydrazone	11.30	(80)
$C_{13}H_{13}N$	Benzylaniline	8.70	(43)
$C_{13}H_{17}NO$	Cyclohexyl aminobenzoate	14.20	(62)
$C_{14}H_8O_2$	Anthraquinone	14.80	(11)
$C_{14}H_{10}$	Anthracene	11.65	(40)
$C_{14}H_{10}$	Phenanthrene	12.00	(44, 46, 79)
$C_{14}H_{10}O_2$	Benzil	10.50	(6, 64)
$C_{14}H_{12}$	Stilbene	8.38	(24)
$C_{14}H_{14}$	Dibenzyl	7.20–7.23	(43, 64)
$C_{14}H_{14}N_2O_3$	p, p′-Azoxyanisole	7.64	(7)
$C_{16}H_{32}O_2$	Palmitic acid	4.40	(35)
$C_{16}H_{34}O$	Cetyl alcohol	6.15	(36)
$C_{18}H_{34}O_2$	Elaidic acid	3.90	(23)
$C_{18}H_{36}O_2$	Stearic acid	4.40–4.50	(36, 46)
$C_{19}H_{16}$	Triphenylmethane	12.45	(43)
$C_{22}H_{42}O_2$	Brassidic acid	4.16	(68)
$C_{22}H_{42}O_2$	Erucic acid	5.23	(68)
$C_{22}H_{42}O_2$	Isoerucic acid	5.25	(68)
$C_{22}H_{44}O_2$	Behenic acid	4.44	(67.5)
$C_{57}H_{110}O_6$	Stearin	5.15	(36)

See further p. 215.

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(For a key to the periodicals see end of volume)

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FREEZING-POINT—SOLUBILITY DATA FOR NON-AQUEOUS SYSTEMS, CONTAINING BOTH ORGANIC AND INORGANIC COMPOUNDS

Robert Kremann

Scope

This section covers all non-aqueous two-component systems composed of (1) a chemical compound whose key-formula does not begin with 16 (called the A-component) together with (2) a chemical compound whose key-formula begins with 16 (called the B-component); and all non-aqueous three-component systems containing one but only one chemical compound whose key-formula begins with 16.

Arrangement

To find a given system: Look first in Part I and, if not found there, consult Part II. For cryoscopic data consult Part IV.

Part I (p. 186)

Part I includes two-component systems for which data are available over a considerable range of temperature and compositions. The systems are arranged in order of their A-components using the standard arrangement (*v.* Vol. III, p. viii). Under each A-component the B-components are in order of increasing number of carbon atoms (the ℭ-arrangement).

Part II (p. 205)

The data in Part II are largely fragmentary in nature, consisting of solubilities of one constituent at one or at a few temperatures only. The arrangement is first by "solvents" in ascending order of number of carbon atoms. The "solutes" under each solvent are in the standard arrangement (*v.* Vol. III, p. viii).

Part III (p. 211)

Three-component systems. Standard arrangement.

Part IV (p. 214)

Cryoscopic data.

Übersicht

Dieser Abschnitt enthält alle nicht wässrige Zweikomponenten Systeme die zusammengesetzt sind (1) aus einer chemischen Verbindung deren Schlüsselformel nicht mit 16 beginnt (genannt A-Komponente) und (2) zusammen mit einer chemischen Verbindung deren Schlüsselformel mit 16 beginnt (genannt B-Komponente). Es sind hier ferner alle nicht wässrige Dreikomponenten Systeme enthalten die eine und zwar nur eine chemische Verbindung enthalten, deren Schlüsselformel mit 16 beginnt.

Anordnung

Um ein gegebenes System zu finden sehe man zuerst im Teil I nach. Liegt es hier nicht vor, so schlage man Teil II auf. Für kryoskopische Daten verwende man Teil IV.

Teil I (S. 186)

Teil I enthält das Zweikomponentensystem für welches über ein beträchtliches Temperatur und Zusammensetzungsgebiet Daten vorliegen. Diese Systeme sind nach ihren A-Komponenten mit Benützung der Standardanordnung (Bd. III, S. viii) gereiht. Unter jeder A-Komponente folgen die B-Komponenten mit zunehmender Zahl der Kohlenstoffatome, (ℭ-Anordnung).

Teil II (S. 205)

Die Werte in diesem Teil sind meistens ihrer Natur nach unvollständig und enthalten die Löslichkeit nur des einen Bestandteiles bei einer Temperatur oder nur bei wenigen Temperaturen. Die Anordnung folgt zuerst dem "Lösungsmittel" nach steigender Zahl der Kohlenstoffatome. Die "gelösten Stoffe" bei jedem Lösungsmittel folgen nach der Standardanordnung (Bd. III, S. viii).

Teil III (S. 211)

Dreikomponenten Systeme. Standardanordnung.

Teil IV (S. 214)

Kryoskopische Daten.

Champ de la section

Cette section comprend tous les systèmes non aqueux à deux constituants composés (1) d'un composé chimique dont la formule clé ne commence pas par 16 (appelé le constituant A) avec (2) un composé chimique dont la formule clé commence par 16 (appelé le constituant B); et tous les systèmes non aqueux à trois constituants contenant seulement un composé chimique dont la formule clé commence par 16.

Arrangement

Pour trouver un système donné; voir d'abord à la Partie I et si on ne le trouve pas à cette place consulter la Partie II. Pour les données cryoscopiques consulter la Partie IV.

Partie I (p. 186)

La Partie I comprend les systèmes à deux constituants pour lesquels les données sont disponibles dans un intervalle considérable de température et de compositions. Les systèmes sont arrangés dans l'ordre de leurs constituants A suivant l'arrangement type (*v.* Vol. III, p. viii). Sous chaque constituant A, les constituants B sont disposés dans l'ordre croissant du nombre d'atomes de carbone (Arrangement ℭ).

Partie II (p. 205)

Les données dans la Partie II sont pour la plupart fragmentaires et consistent en solubilités d'un constituant à une ou à quelques températures seulement. L'arrangement est d'abord fait suivant les "dissolvants" disposés dans l'ordre ascendant du nombre d'atomes de carbone. Les "corps dissous" dans chaque solvant sont disposés suivant l'arrangement type (*v.* Vol. III, p. viii).

Partie III (p. 211)

Systèmes à trois constituants. Arrangement type.

Partie IV (p. 214)

Données cryoscopiques.

Sommario

Sono contenuti in questo capitolo tutti i sistemi non acquosi a due componenti costituiti da un composto con formula chiave che non comincia con 16 (Componente A) e da un composto con formula chiave che comincia con 16 (Componente B). Vi sono inclusi inoltre tutti i sistemi non acquosi a tre componenti, uno dei quali ha formula chiave che comincia con 16.

Ordine di disposizione

Per trovare un dato sistema si consulti prima la Parte I, e, se non si trova in questa, si consulti la Parte II. Per i dati crioscopici si consulti la Parte IV.

Parte I (p. 186)

Questa comprende i sistemi a due componenti per i quali si hanno dati che si riferiscono ad un largo intervallo di temperatura e di composizione. I sistemi sono elencati nell'ordine dei componenti A secondo la maniera standard di disposizione (*v.* Vol. III, p. viii). Sotto ciascun componente A sono disposti i componenti B ordinati secondo il numero crescente degli atomi di carbonio (disposizione ℭ).

Parte II (p. 205)

I dati di questa seconda parte sono molto frammentari e si riferiscono alla solubilità di un componente a una sola temperatura o a poche temperature. Nell'elenco "i solventi" sono disposti nell'ordine crescente del numero di atomi di carbonio. Le sostanze disciolte sono segnate sotto ciascun solvente secondo l'ordine standard di disposizione (*v.* Vol. III, p. viii).

Parte III (p. 211)

Sistemi a tre componenti. Ordine standard di disposizione.

Parte IV (p. 214)

Dati criosopici.

TWO-COMPONENT SYSTEMS
Part I
For abbreviations, *v.* p. 4

H_2O_2

B = $C_{12}H_{22}O_{11}$
Sucrose (68)

°C	Mol % B
B	
-1.70	0.0
-1.97	0.40
-2.60	1.24
-3.47	2.23
-4.72	3.23
-5.70	4.26
-7.57	5.46
-10.30	6.94
-14.32	9.04

HCl

B = CH_3Cl (6)

°C	Mol % B
B	
-93.0	100.0
-98.7	90.5
-100.2	79.5
-109.4	71.8
-114.6	65.9
-121.4	60.1
-123.3	56.2
-131.7	48.9
-136.4	43.9
-148.9	36.8
A + B	
-161E	27.3
A	
-130.4	14.5
-111.0	0.0

B = CH_4O
Methyl alcohol (9, 10)
See Fig. 1, p. 212

B = C_2H_6
Ethane (7)
See Fig. 2, p. 212

B = C_2H_6O
Methyl ether (4, 5, 69)
See Fig. 3, p. 212

B = $C_3H_6O_2$
Propionic acid (7, 9)
See Fig. 4, p. 212)

B = $C_4H_{10}O$
Ethyl ether (70)

°C	Mol % A
A	
-112.0	100.0
-114.0	99.3
-116.5	98.0
A_5B	
-108.0	88.9
-93.0	86.0
-90.0	83.9
-89.0	83.5

B = $C_4H_{10}O$.—(*Continued*)

°C	Mol % A
A_5B	
-90.0	82.4
-92.0	81.8
-96.0	80.0
$A_5B + A_2B$	
-100.0E	78.7
A_2B	
-98.5	78.0
-93.0	76.7
-92.0	75.5
-90.0	73.4
-88.0	70.4
-88.0	67.2
-89.0	**66.6**
-95.0	64.3
-100.0	63.6
AB	
-104.0	60.4
-100.0	59.8
-96.0	55.5
-95.0	53.9
-94.0	51.3
-93.0	**50.0**
-93.5	49.2
-97.0	46.8
-100.0	44.4
-105.0	41.5

B = C_6H_7N
Aniline (63)

°C	Mol % B
Under 1 atm.	
B	
-6.8	100.0
AB	
-7.3	98.0
+24.2	95.3
49.9	90.9
99.8	83.3
124.4	76.8
141.5	71.4
154.0	66.7
158.0	65.0
164.6	62.5
174.4	58.8
186.2	55.5
192.2	53.0
197.5	51.0
198.6	50.8
199.2	**50.0**
Under the vapor pressure of the mixture	
AB	
199.0	49.8
198.7	49.7
+11	19.6
-28	12.0
-62	5.3
A	
-112.5	0

B = C_6H_7N.—(*Continued*)

°C	Mol % B
Two liquid phases. Concentration and temperature limits	
20.0	1.1
13.8	1.9
10.5	5.3
23.0	10.6

HBr

B = CH_3Cl (69)

°C	Mol % A
A	
-86.0	100.0
-95.0	91.0
-101.0	83.6
-106.0	75.0
A + B	
ca. -115E	
B	
-105.0	49.8
-101.5	47.0
-97.5	42.2
-92.0	35.0
-87.0	28.4
-78.0	18.4
-71.0	10.9
-69.5	9.9
-67.0	5.5
-62.5	0.0

B = CH_4O
Methyl alcohol (69)

°C	Mol % A
A	
-86.0	100.0
-87.5	96.0
-94.0	89.0
-97.0	86.7
AB	
-85.0	76.6
-72.4	74.2
-58.0	70.8
-13.5	54.2
-12.0	**50.0**
-12.8	49.6
-33.9	42.3
-44.4	40.8
-54.5	34.5
-64.0	31.4

B = C_2H_2 (71)

°C	Mol % A
B	
-81.8	0.0
-82.5	2.4
-85.7	4.5
-88.2	5.5
-93.2	9.2
-97.3	11.3
-101.3	14.3
-103.7	15.4
-109.6	19.4
-113.1	23.2
-115.2	24.3
-117.6	26.7
-125.2	34.1

B = C_2H_2.—(*Cont'd*)

°C	Mol % A
A	
-126.0	38.0
-120.2	42.2
-115.0	48.2
-86.0	100.0

B = C_2H_6O (69)
Ethyl alcohol

°C	Mol % A
A	
-86.0	100.0
-88.0	96.3
-91.5	92.2
-95.5	88.8
-97.0	87.3
A + AB	
-104E	85.4
AB	
-83.5	68.0
-62.5	66.6
-56.5	65.3
-50.1	63.5
-45.2	61.6
-40.5	59.8
-34.8	57.5
-33.3	55.6
-31.4	54.2
-30.3	52.7
-29.6	50.9
-28.5	50.3
-29.5	48.5
-30.0	46.0
-37.5	41.3
-40.0	41.0
-45.0	39.9
-54.0	38.0
-68.1	35.5
-73.4	35.2

B = C_2H_6O (69)
Methyl ether

°C	Mol % A
A	
-86.0	100.0
-86.8	97.6
-88.0	94.8
-90.2	89.7
-93.3	78.3
-95.2	76.1
A + AB	
-100E	
AB	
-74.3	65.5
-64.7	64.8
-42.0	61.6
-30.4	60.8
-26.3	59.7
-21.1	57.0
-14.4	52.3
-12.3	**50.0**
-13.0	48.5
-13.5	46.7
-14.3	43.8
-14.9	42.2
-16.6	38.9
-18.4	36.6
-18.7	35.7

B = C_2H_6O.—(*Continued*)

°C	Mol % A
AB	
-19.7	34.8
-26.3	23.8
-32.5	14.6
-35.5	11.8
-37.2	10.5
-46.3	8.15
-48.2	7.65
-61.0	4.72
-66.2	4.05
-75.0	3.32
-77.3	2.91
-99.8	1.73
B	
-138.0	0.0

B = C_3H_4 (72)
Allylene

°C	Mol % A
B	
-105.0	0.0
-112.3	17.9
-121.5	29.0
-129.5	37.1
AB	
-129.1	40.2
-127.2	43.5
-126.5	47.4
-126.1	49.3
-127.6	54.2
-128.8	58.4
-134.0	68.6
-137.5	73.7
A	
-120.5	82.2
-101.6	91.2
-86.0	100.0

B = C_3H_6O (69)
Acetone

°C	Mol % A
A	
-86.0	100.0
-86.8	98.2
-90.5	93.2
-94.0	88.5
AB	
-30.6	66.0
-19.3	64.6
-11.7	62.6
-6.0	59.0
-3.2	56.7
-3.0	52.2
-4.1	48.1
-5.8	39.0
-14.0	35.7
-14.0	32.6
-16.0	30.7
-24.2	28.0
-31.4	24.7
-36.0	23.2
-41.2	21.8
-50.5	19.4
-57.0	17.5
-61.0	16.3

B = $C_4H_8O_2$ (69)
Ethyl acetate

°C	Mol % A
A	
-86.0	100.0
-89.0	96.2
-92.0	94.5
-97.0	92.5
A_4B	
-85.2	84.9
-71.3	83.8
-69.2	83.6
-69.2	82.7
-67.1	82.1
-63.0	81.0
-61.0	80.4
-60.0	**80.0**
-65.5	79.2
$A_4B + A_5B_2$	
-68.1E	78.4
A_5B_2	
-63.0	77.4
-59.0	75.8
-54.0	74.3
-54.0	74.0
-52.5	72.9
-52.0	**71.4**
-52.5	70.1
-52.5	70.0
-53.0	69.8
-57.0	68.0
$A_5B_2 + AB$	
-59.0E	65.8
AB	
-56.0	65.0
-51.0	62.6
-45.0	60.8
-41.0	58.2
-39.0	57.2
-37.0	55.1
-36.1	53.2
-36.0	**50.0**
-36.3	48.0
-37.0	45.4
-38.0	42.2
-41.0	37.8
-44.0	32.2
-46.0	29.8
-49.0	26.8
-51.0	22.1
-54.5	16.7
-58.0	12.0
-69.1	5.8
B	
-83.0	0.0

B = $C_4H_{10}O$ (75)
Ethyl ether

°C	Mol % A
B	
-118	0.0
B + AB	
-115E	
AB	
-98	1.47
-92	2.00
-79	2.75
-69	7.56
-65	9.04

B = $C_4H_{10}O$.—(*Continued*)

°C	Mol % A
AB	
−61	10.6
−58.5	12.75
−54	15.10
−50.5	18.06
−46	21.85
−44	28.05
−43	39.4
−40	**50.0**
A_2B	
−46	**66.7**
−64	74.2
−78	78.4
−94	82.3
−100	84.7
A	
−98	93.5
−95	95.1
−91	97.9
−86	100.0

B = C_6H_6 (71)

B	
5.4	0
+1.3	5.7
−3.5	12.5
−4.0	13.5
−12.5	26.3
−20.5	32.7
−26.5	37.4
−31.0	41.1
−39.0	45.6
−40.0	47.2
−42.0	50.1
−47.0	56.2
−56.5	64.3
−65.0	72.8
−70.5	77.2
−79.5	85.2
−87.5	88.7
A + B	
−95.0E	92.7
A	
−90.0	96.0
−86.0	100.0

B = C_7H_8 (69)
Toluene

A	
−86.0	100.0
−96.0	97.0
−100.0	94.3
−107.5	91.6
−116.0	88.8
−122.0	86.4
−128	83.0
A + AB_2	
−130E	81.4
AB_2	
−128	77.0
−124	74.7
−115	73.8
−112.5	72.0
−107.5	62.8
−103.5	59.9

B = C_7H_8.—(*Cont'd*)

°C	Mol % A
AB_2	
−98.0	54.7
−94.0	50.6
−92.0	48.1
−90.5	44.0
−88.5	39.9
−87.0	37.2
−87.0	32.5
−88.5	29.1
−89.5	24.9
−94.0	21.1
−95.0	18.1
AB_2 + B	
−100.0E	13.7
B	
−98.0	5.5
−94.0	0.0

B = C_7H_{14} (67)
Methylcyclohexane

°C	Mol % B
A	
−86.0	0.0
−87.9	2.0
−89.9	4.0
−91.4	6.0
−92.5	7.9
−93.9	10.1
−96.3	15.6
−97.8	19.6
−100.4	25.2
−101.9	28.8
−103.4	32.6
−105.3	37.5
−107.6	43.4
−110.0	49.9
−111.8	54.2
−113.8	59.7
vis.	60–100
B	
−124.5	100.0

B = C_8H_{10} (71)
Ethylbenzene

°C	Mol % A
B	
−92.4	0.00
−97.7	11.5
−103.6	24.0
AB_2	
−104.0	31.9
−103.8	**33.3**
−104.0	34.4
−110.2	40.1
AB	
−118.5m	28.5
−115.2m	32.0
−112.6m	34.5
−109.2	42.7
−106.0	46.6
−105.5	**50.0**
−106.3	52.4
−108.8	59.1
−112.2	64.4
−116.7	71.4
−120.5	75.4
−125.2	79.9

B = C_8H_{10}.—(*Continued*)

°C	Mol % A
A	
−125.0	83.8
−105.8	88.4
−96.5	92.7
−90.8	96.3
−86.0	100.0

B = C_8H_{10} (67)
o-Xylene

°C	Mol % B
A	
−86.0	0.0
−92.0	3.1
−96.5	6.6
−111.0	12.1
A + B	
−116E	14.0
B	
−114.0	14.9
−107.0	19.0
−96.5	25.3
−91.0	28.1
−89.1	30.8
−85.7	34.7
−83.6	38.0
−76.2	42.7
−74.5	46.0
−68.5	49.3
−65.5	52.3
−64.5	55.3
−61.5	58.3
−57.5	62.2
−56.0	65.2
−52.5	69.5
−48.5	73.8
−47.5	79.0
−45.5	83.7
−44.0	87.3
−42.0	91.8
−40.0	95.8
−38.5	100.0

B = C_8H_{10} (67)
m-Xylene

A	
−86.0	0.0
AB	
−111.1	13.1
−88.6	24.8
−86.9	27.6
−83.7	35.6
−80.8	36.9
−79.0	41.8
−78.2	43.5
−77.7	44.8
−77.5	48.1
−77.6	49.3
A	
−75.5	51.8
−73.5	53.1
−68.8	58.0
−63.2	66.7
−58.4	75.5
−54.9	86.9
−54.0	100.0

B = C_8H_{10} (67)
p-Xylene

°C	Mol % B
A	
−86.0	0.0
−93.5	4.5
−97.1	7.0
−101.4	10.6
B	
−76.8	20.3
−62.1	25.5
−48.1	31.1
−21.0	34.8
−26.0	43.5
−20.8	48.2
−15.9	52.0
−10.8	56.9
−1.5	69.5
+5.7	82.0
9.4	86.5
11.5	92.3
15.0	100.0

B = C_9H_{12} (71)
Mesitylene

°C	Mol % A
B	
−53.5	0.0
−56.5	4.0
−57.5	6.5
−65.5	16.3
−68.5	25.2
−66.5	33.8
−64.5	39.2
AB	
−63.0	44.4
−61.5	**50.0**
−61.7	51.3
−61.7	58.5
−62.2	59.9
−62.5	61.4
−67.5	65.3
−68.4	67.1
−82.0	76.0
−90.0	79.8
−103.5	84.0
A	
−105.0	89.0
−98.5	93.9
−86.0	100.0

B = C_9H_{12} (67)
n-Propylbenzene

°C	Mol % B
A	
−86.0	0.0
−88.3	2.1
−92.6	4.5
−97.9	8.0
−107.8	12.0
−119.1	15.8
AB	
−119.4	19.4
−116.8	23.2
−115.4	25.2
−114.4	27.9
−113.5	31.5
−109.3	35.3

B = C_9H_{12}.—(*Continued*)

°C	Mol % B
AB	
−107.4	38.1
−106.1	41.6
−105.2	46.2
−105.4	50.1
−105.9	54.3
−106.5	58.5
−110.3	62.6
−113.4	65.5
B	
−145.0	100.0

HI

B = C_2H_6O (69)
Methyl ether

°C	Mol % A
A	
−50.9	100.0
−53.4	96.7
−64.1	89.8
−77.0m	72.7
A + AB	
−78E	72.5
AB	
−47.5	65.5
−40.7	58.7
−35.7	56.1
−30.8	53.8
−26.3	52.5
−21	**50.0**
−22.0	45.7
?	
−25.0	27.2
−35.0	12.3
−56.0	6.1

SO_2

B = CO_2 crys. (148)
At −78.59°C, Mol % B = 33.6 in satd. soln.; = 99.72 in satd. vapor

B = CCl_4 (19); *cf.* (168)

°C	Wt. % B	
B		
−66.1	5.24	
−57.9	8.42	
−47.2	16.44	
(−45)*	(20)	
Two liquid phases		
(−45)*	(20)	(93)
−35.2	31.66	
−39.8		88.44
−33.6		80.83
−29.8		66.26
−29.7	49.93	
−29.3†	(55)	(55)
B		
−30.58	97.8	
−26.78	98.8	
−24.8	100	

* Quadruple points.
† Critical solution temp.

B = CH_4O (10)
Methyl alcohol
See Fig. 5, p. 212

B = C_2H_6O (5)
Methyl ether

°C	Mol % B
A	
−72.3	0
A + AB	
−109E	34
AB	
−91.5	**50**
AB + B	
−144E	88.5
B	
−138.5	100

B = C_6H_{12} (141)
Cyclohexane

°C	Mol % A	
B		
+6.4	0.00	
−4.3	5.18	
Two liquids (interpolated)		
−17.0	12.1	97.0
−7.0	17.7	94.9
0.0	23.9	92.8
+7.0	33.6	88.2
11.4	44.1	80.0
13.4	65.6	71.2
13.6 crit.	*ca.* 69.2	
B		
−24.3	97.7	
−34.3	98.1	
−51.0	98.9	
−56.0	99.2	
−60.0	99.4	
−64.5	99.6	
A + B		
−72.5E	99.95	
A		
−72.3	100.0	

B = $C_{10}H_{16}O$ (14)
Camphor

°C	Mol % B
A	
−76	0.0
−77	1.36
−78	2.83
−79	4.05
−80	6.16
−81	8.15
A + A_2B	
−82E	10.6
A_2B	
−80	11.5
−77	13.0
−75	14.3
−71	16.4
−64	20.4
−59	23.5
−54	27.0
−49	30.5
−46	32.7
−45.3	33.5

SO_2.—(*Cont'd*)

$C_{10}H_{16}O$.—(*Continued*)

°C	Mol % B
$A_2B + AB$	
−46E	34.1
AB	
−45	34.5
−44	35.4
−41.5	36.8
−38.5	38.7
−36	40.3
−33.5	41.3
−28	45.5
−25	48.0
−24.5	49.6
−25.5	52.4
−27	57.4
B	
−25	58.2
−23	59.5
−16	61.8
−13	63.5
+178	100.0

B = $C_{16}H_{34}O$ (140.5)
Cetyl alcohol

°C	Wt. % A
5.3	99.58
22.2	92.30
22.6	89.58
22.7	88.80
23.8	71.66
23.5	68.82
23.9	65.13
24.8	53.61
25.5	42.54
27.8	33.73
30.9	21.07
41.6	4.15

H_2S

B = CO_2 (148)

At −75.17°, Mol % B = 25.4 in satd. soln.; = 75.3 in satd. vapor

B = CH_4O (11)
Methyl alcohol
See Fig. 6, p. 212

B = C_2H_6O (11)
Methyl ether
See Fig. 7, p. 212

H_2SO_4

B = $C_2HCl_3O_2$ (52)
Trichloroacetic acid
Stable

°C	Mol % B
A	
10.3	0.0
7.5	2.9
A + α-B	
3	7.0
α-B	
15.5	11.3
21.6	14.1

B = $C_2HCl_3O_2$.—(*Continued*)

°C	Mol % B
α-B	
29.0	17.9
31.7	21.0
35.3	24.9
39.5	26.1
39.2	30.8
41.9	33.2
42.6	37.7
44.8	41.7
47.0	49.5
47.0	54.0
49.2	58.3
51.2	68.2
53.4	78.1
56.1	89.3
57.3	100.0
Metastable	
A + β-B	
1.0mE	7.8
β-B	
13.4m	13.4
20.2m	17.8
24.0m	21.9
33.8m	32.9
38.4m	43.9

B = $C_2H_3ClO_2$ (52)
Chloroacetic acid

°C	Mol % B
B	
9.2	46.0
25.2	53.7
34.5	59.7
38.1	62.3
41.1	65.1
52.7	78.9
57.8	88.1
60.5	94.4
61.7	100.0

B = $C_4H_5ClO_2$ (52)
α-Chlorocrotonic acid

°C	Mol % B
B	
2.0	31.0
30.0	39.0
41.0	43.9
49.5	48.1
58.5	52.8
64.0	56.6
73.2	63.5
79.5	69.4
86.5	80.2
93.5	90.4
99.0	100.0

B = $C_4H_6O_2$ (52)
Crotonic acid

°C	Mol % B
AB	
1.5	33.7
15.8	38.1
23.3	43.5
24.5	49.7
21.3	54.9
AB + B	
18E	58

B = $C_4H_6O_2$.—(*Continued*)

°C	Mol % B
B	
22.3	59.3
40.4	65.9
47.0	69.1
54.7	74.6
61.9	83.5
67.5	93.8
71.0	100.0

B = $C_5H_8O_4$ (52)
Glutaric acid

°C	Mol % B
AB	
40.1	33.5
46.0	39.0
47.7	41.6
49.7	45.5
50.5	**50**
AB + B	
49E	53
B	
35.0m	47.8
37.1m	49.0
51.7	54.1
63.9	59.6
75.7	65.2
82.5	70.9
88.6	78.8
92.9	87.4
95.8	100.0

B = $C_6H_5NO_3$ (52)
o-Nitrophenol

°C	Mol % B
B	
11.0	25.8
21.0	32.0
30.0	40.7
33.5	45.6
37.0	52.6
39.3	59.3
39.1	66.5
39.5	68.9
40.7	75.7
42.4	88.0
45.0	100.0

B = $C_6H_5NO_3$ (52)
m-Nitrophenol

°C	Mol % B
AB_2	
18.0	24.7
39.4	31.7
52.2	37.7
62.3	45.9
69.4	51.4
73.5	55.2
78.6	60.5
83	**66.6**
82.7	68.5
81.7	73.5
AB_2 + B	
80E	77
B	
84.7	82.0
89.4	87.7
92.5	93.3
95.4	100.0

B = $C_6H_5NO_3$ (52)
p-Nitrophenol

°C	Mol % B
AB_2	
35.1	35.6
60.3	44.7
70.4	50.6
73.5	53.0
80.7	58.4
88.3	64.1
90	**66.6**
89.9	68.1
AB_2 + B	
87E	70
B	
97.0	76.9
102.7	83.9
109.4	92.7
113.8	100.0

B = C_6H_6O (52)
Phenol

°C	Mol % B
AB_2	
−10.0	34.1
− 7.0	36.3
− 2.0	39.5
+ 2.5	42.7
6.0	45.7
8.0	49.5
10.4	51.8
12.2	55.4
14.5	61.3
15.5	**66.6**
AB_2 + B	
10E	70
B	
13.4	72.0
23.4	79.4
30.5	86.6
35.5	94.1
42.4	100.0

B = $C_7H_5NO_3$ (52)
p-Nitrobenzaldehyde

°C	Mol % B
B	
104.4	100.0
100.7	90.6
94.8	79.7
90.9	73.2
85.0	65.0
76.6	55.4
74.5	49.7
74.8	49.5
73.0	47.3
70.4	43.9
67.1	41.1
66.7	40.2
54.0	34.5
56.5	33.7
32.6	24.1

B = $C_7H_6O_2$ (52)
Benzoic acid

°C	Mol % B
B	
121.8	100.0
120.6	98.0
115.8	92.1

B = $C_7H_6O_2$.—(*Continued*)

°C	Mol % B
B	
109.6	83.9
92.5	69.1
90.0	67.4
AB + B	
81.5E	61.5
AB	
82.3	60.2
84.2	56.9
86.2	51.8
87.5	**50.0**
86.3	44.3
83.2	39.2
77.2	34.2
72.3	30.8
61.4	26.2
53.2	24.2
44.6	22.6
+25.8	18.6
AB + A	
−10E	12
A	
− 6.2	9.9
− 1.2	8.0
+ 3.2	5.7
7.0	3.2
10.3	0.0

B = C_7H_8O (52)
o-Cresol

°C	Mol % B
B	
30.4	100.0
26.2	89.1
18.8	76.8
9.6	68.7
6.2	66.2
1.0	61.9

B = C_7H_8O (52)
p-Cresol

°C	Mol % B
B	
34.6	100.0
29.4	90.4
22.1	82.2
11.6	75.4
B + AB_2	
7E	72.5
AB_2	
11.0	68.0
12.0	**66.6**
11.0	62.6
7.5m	54.1
5.0m	50.5
AB_2 + A_2B	
9.3E	58.5
A_2B	
24.0	56.0
57.3	48.7
84.1	39.5
91.9	34.7
93.4	33.8
90.9	28.6
78.2	21.6
57.8	16.2
40.2	12.5

B = $C_7H_8O_2$ (52)
Dimethylpyrone

°C	Mol % B
B	
132.0	100.0
124.0	85.4
115.0	76.1
109.0	71.5
B + AB_2	
103E	68.5
AB_2	
103.6	**66.7**
101.8	63.5
100.2	61.1
90.4	57.3
AB_2 + AB	
84.2E	55.5
AB	
88.1	53.0
93.4	51.3
96.0	**50.0**
93.4	47.1
90.9	46.2
72.5	43.3
56.0	41.8
41.6	40.5
AB + A_3B_2	
36.6E	40
A_3B_2	
44.8	**40**
44.3	39.5
43.1	38.3
37.6	36.1
29.3	34.1
18.2	32.2
6.0	30.4

B = C_8H_8O (52)
Acetophenone

°C	Mol % B
B	
18.7	100.0
17.2	95.8
17.4	95.2
B + AB_2	
13.9E	89.0
AB_2	
17.6	86.3
23.8	80.8
28.4	69.0
29	**66.7**
28.0	63.0
25.0	59.9
22.5	54.9
18.5	51.1

B = $C_8H_8O_2$ (52)
Phenylacetic acid

°C	Mol % B
A	
10.3	0.0
+ 5.6	2.5
− 3.0	5.1
AB + A	
− 9.0E	6.8
AB	
+15.8	16.3
47.7	28.7
55.0	36.2

B = $C_8H_8O_2$.—
(*Continued*)

°C	Mol % B
AB	
58.7	37.9
60.0	39.5
60.7	42.6
61.2	45.1
61.8	**50.0**
60.0	53.7
58.4	56.3
AB + B	
40.6	61.6
B	
50.1	65.3
53.2	67.1
55.0	68.7
56.8	69.9
59.4	71.6
67.7	83.8
71.5	91.1
76.8	100.0

B = $C_8H_8O_2$ [52]
o-Toluic acid

B	
102.9	100.0
97.8	88.7
92.0	78.0
83.6	68.1
82.2	66.7
74.2	61.1
67.0	58.1
B + AB	
57.5E	55
AB	
58.7	51.9
59	**50.0**
58.2	47.4
57.6	44.3
56.3	39.5
54.6	37.0
49.1	33.6
45.6	30.7
33.5	25.6
+12.0	20.1
AB + A	
−14E	16
A	
+ 3.0	4.6
7.2	2.4
10.3	0.0

B = $C_8H_8O_2$ [52]
m-Toluic acid

B	
110.0	100.0
100.5	84.5
92.0	74.3
83.6	67.7
78.7m	64.1
74.9m	61.8
B + AB_2	
79.3U	64.7

B = $C_8H_8O_2$.—
(*Continued*)

°C	Mol % B
AB_2	
79.5	**66.7**
78.9	61.8
78.3	60.2
78.3	59.5
78.0	58.7
76.2	55.6
75.9	54.1
72.2	50.9
71.6	49.9
68.8	47.1
62.3m	45.0
36.2m	36.3
AB_2 + AB	
62.5U	46
AB	
63.5m	**50**
61.8	42.5
58.4	39.7
55.6	36.4
54.0	34.8
52.7	34.0
46.5	30.8
37.5	27.1
20.8	22.4
AB + A	
190E	16
A	
− 1.8	7.7
+ 7.3	2.4
10.3	0.0

B = $C_8H_8O_2$ [52]
p-Toluic acid

A	
10.3	0.0
5.8	1.7
+ 3.0	3.2
− 2.2	6.2
AB + A	
−15E	13
AB	
+ 7.5	14.7
18.0	16.8
53.0	21.2
58.7	23.0
77.5	28.1
88.5	32.8
94.9	37.1
98.9	42.2
99.5	45.5
AB + B	
100U	46
B	
100.2	46.8
111.2	49.6
116.0	51.3
127.0	55.2
137.5	59.6
143.7	62.9
154.7	71.0
167.5	84.2
180.2	100.0

B = $C_8H_{10}O$ [52]
3, 4-Dimethylphenol

°C	Mol % B
A_2B	
58.3	16.1
72.8	20.3
84.8	25.3
89.4	30.4
90.0	**33.3**
80.7	41.5
71.5	44.6
60.8	47.8
A_2B + AB_2	
53.8E	50.7
AB_2	
63.4	54.4
68.9	60.2
70.0	**66.6**
68.0	70.9
AB_2 + B	
50E	80
B	
31.6	63.7
42.4	72.1
47.0	75.8
57.6	87.5
63.7	100.0

B = $C_8H_{10}O$ [52]
2, 5-Dimethylphenol

A_2B	
91.9	24.7
104.0	**33.3**
100.0	40.1
92.4	46.4
A_2B + AB	
90.5E	48
AB	
91.0	**50**
90.4	54.0
87.2	61.7
84.2	67.0
80.6	71.7
AB + B	
67.9E	81.1
B	
71.0	91.1
74.0	100.0

B = $C_9H_6O_2$ [52]
Coumarin

AB	
14.0	35.2
24.0	38.4
32.3	42.6
34.5	46.2
35.5	**50.0**
32.7	54.2
AB + B	
29E	57
B	
30.8	58.4
40.4	63.5
46.5	68.3
51.2	73.1

B = $C_9H_6O_2$.—
(*Continued*)

°C	Mol % B
B	
53.4	80.7
62.3	89.2
68.4	100.0

B = $C_{10}H_{14}O$ [52]
Thymol

B	
42m	64.7
42m	72.2
43m	83.3
47.1	92.4
49.6	100.0

B = $C_{13}H_{10}O$ [52]
Benzophenone

AB	
39.1	29.6
48.7	32.6
55.2	35.7
59.4	38.8
61.9	42.6
63.9	46.2
64	**50**
63.0	54.1
56.6	64.5
AB + B	
26.5E	70.9
B	
38.0	79.8
42.1	88.7
44.5	92.9
46.4	96.4
47.8	100.0

B = $C_{14}H_{10}O_3$ [52]
Benzoic anhydride

A_2B	
25.0	15.8
55.4	26.5
58.7	31.5
60	**33.3**
58.7	36.1
A_2B + AB	
58.3E	37.4
AB	
59.1	37.8
67.6	43.7
70.5	**50**
69.4	55.4
64.3	62.2
57.3	67.6
AB + AB_2	
51.3U	72
AB_2	
51.0	73.5
50.0	77.2
49.2	81.0
45.3	85.7
42.3	90.2
38.9	94.8
AB_2 + B	
37E	97
B	
39.5	100

SO_2Cl_2

B = $C_6H_{10}O_6$ [49]
Dimethyl tartrate

°C	Mol % B
B	
−38	100
−39	98.3
−41	91.6
−43.5	87.9
?	
−43.5	84.7
−41.0	80.6

B = $C_7H_{12}O_5$ [49]
Diethyl malonate

B	
−88	100
−90	96.73
A?	
−82	91.66
−74	88.59
vis.	88 − 0

NO

B = C_2H_6O [8]
Methyl ether
See Fig. 8, p. 212

N_2O_4

B = $C_7H_7NO_2$ [21]
o-Nitrotoluene

°C	Mol % B
A	
−40	20
−45	27
−50	32.5
−55	37
A + AB_2	
−56.5E	38.5
AB_2	
−55	40
−50	46.5
−47.5	50
−44m	**66.6**
AB_2 + B	
−46U	54.5
B	
−40	58
−35	61.5
−30	65
−25	70
−20	75
−15	82.5
−10	93
− 7	100

B = $C_{10}H_{16}O$ [126]
Camphor

°C t_L	°C t_S	Mol % A
A-rich mix. crys.		
−10.2	−10.2	100.0
−10.8	−12.0	97.0
−12.5	−16.5	93.7
−15.5	−24.5	88.3
−21.5	−42.5	83.3
−29.0	−60.0	80.0
−37.6	−60.0	75.4
−46.5	−60.0	73.5

B = $C_{10}H_{16}O$.—
(*Continued*)

°C	Mol % A
81.8 Mol % A mix. crys. + A_5B_4	
−60.0E	71.0
A_5B_4	
−56.5	65.1
−53.5	62.3
−52.3	57.4
−52.1	54.9
−52.2	52.4
−53.5	48.2
−55.0	46.9
−50.0	46.5
A_5B_4 + A_2B_3	
−55.5E	45.5
A_2B_3	
−46.00	42.6
−45.7	41.5
−45.5	38.9
A_2B_3 + B	
−46.5E	36.8
B	
−38.2	34.3
−31.46	31.7
−17	29.5
(179)	0.0

NH_3

B = CH_4O [11]
Methyl alcohol
See Fig. 9, p. 212

B = C_2H_6O [11]
Methyl ether
See Fig. 10, p. 212

H_3PO_4

B = $C_4H_{10}O$ [135]
Ether

°C	Mol % B
A	
38.4*	0.00
30.1	1.98
28.7	2.72
28.3	2.83
26.5	3.68
23.4	5.02
21.0	6.38
17.7	9.70
17.5	9.89
16.9	10.7
A + A_6B	
16.0E	12.7
A_6B	
17.5	13.0
22.1	13.45
25.5	13.95
27.5	14.15
28.2	**14.32**
28.0	14.65
25.2	15.10
24.5	15.16

* The acid contains 0.1–0.15 % H_2O. The M. P. of the pure acid must, therefore, be somewhat higher.

H_3PO_4.—(*Cont'd*)

B = $C_4H_{10}O$.—(*Continued*)

°C	Mol % B
$A_6B + A_4B$	
22E	
A_4B	
23.9	15.58
25.0	15.66
25.2	15.94
27.5	16.54
28.4	17.50
29.8	18.94
30.0	19.68
29.3	**19.90**
17.2	20.72
14.0	21.95

P_4S_3

B = CS_2 (145)

°C	Mol % A
A?	
−20	3.70
0	8.54
+17	25.7

B = C_6H_6 (145)

°C	Mol % A
A?	
17	0.88
80	3.80

B = C_7H_8 (145)
Toluene

°C	Mol % A
A?	
17	1.41
111	6.04

$AsBr_3$

B = $C_3H_7NO_2$* (134)
Urethane

°C	Mol % B
A	
31	0
A + B	
4.4E	42
B	
48.3	100

B = C_6H_6O* (134)
Phenol

°C	Mol % B
A	
31	0
A + B	
7.5E	57
B	
40.8	100

B = $C_6H_6O_2$* (134)
Resorcinol

°C	Mol % B
A	
31	0
A + B	
30E	<1
B	
60	20
78.5	40
87.5	60
100.5	80
111	100

* Sandonnini, cooperating expert.

B = C_6H_8ClN* (134)
Aniline hydrochloride

°C	Mol % B
A	
31	0
A + AB	
30E	<1
AB	
110.2	10
122.5	20
129.3	30
AB + B	
132U	41
B	
157	50
166	58

B = $C_{10}H_8$ (133)
Naphthalene

°C	Mol % B
A	
31	0.0
28.7	4.5
25.7	8.0
23.8	10.9
20.6	15.5
$A + A_2B$	
17E	20
A_2B	
18.8	24.9
19.2	27.0
19.5	30.0
19.6	32.0
19.7	**33.3**
$A_2B + B$	
19.6E	34.0
B	
21.6	35.0
28.0	40.3
33.6	45
39.9	50
50.6	60
59.4	70
67.4	80
73.9	90
80.0	100
A	
16.3m	20.5
14.8m	22.0
11.8m	24.9
A + B	
9.6mE	27.0
B	
14.4m	30.0
16.0m	30.7

B = $C_{10}H_8O$* (134)
α-Naphthol

°C	Mol % B
A	
31	0
A + B	
20.8E	20
B	
96	100

* Sandonnini, cooperating expert.

$SbCl_3$

B = $C_2H_4O_2$ (102)
Acetic acid

°C	Mol % A
B	
16.5	0.0
15	1.9
10	7.1
+ 5	12.1
0	16.3
− 5	20.0
B + AB	
− 9	22.6
AB	
− 5	24.8
0	27.8
+ 5	31.2
10	35.3
15	40.8
18	46.2
19	**50.0**
18m	53.6
15m	59.2
AB + A	
18.7E	51.3
A	
5m	46.5
15m	50.0
25	53.9
35	58.8
45	64.3
55	73.0
65	84.0
70	92.5
73	100.0

B = $C_6H_4Br_2$ (100)
p-Dibromobenzene

°C	Mol % A
B	
88	0
85	5.9
80	15.8
75	25.7
70	35.7
65	45.4
60	53.8
55	57.9
A + B	
49.5E	64.9
A	
55	72.5
60	79.8
65	87.1
70	95.2
73	100.0

B = $C_6H_4Br_3N$ (106)
2, 4, 6-Tribromoaniline

°C	Mol % A
B	
119	0
110	19.6
100	33.7
90	44.6
71m	57.9

B = $C_6H_4Br_3N$.—(*Continued*)

°C	Mol % A
B + AB	
80.5U	51.6
AB	
80.5m	48.41
81m	**50.0**
75	62.1
70	67.0
60	74.5
A + AB	
49E	76.8
A	
55	82.2
60	87.1
65	91.9
70	97.0
73	100

B = $C_6H_4Cl_2$ (100)
p-Dichlorobenzene

°C	Mol % A
B	
54.5	0
50	6.3
45	15.5
40	28.8
B + A	
39.5E	29.5
A	
45	37.5
50	46.4
55	56.0
60	66.5
65	78.1
70	91.1
73	100.0

B = $C_6H_4N_2O_4$ (100)
m-Dinitrobenzene

°C	Mol % A
B	
90	0
80	14.3
70	25.3
60	33.8
50	40.7
40	45.6
30	49.8
B + AB	
28.3E	49.9
AB	
28.5	**50.0**
27.5	55.0
25.0	60.2
AB + A	
21.0E	65.5
A	
30	68.8
40	73.2
50	78.5
60	85.8
70	95.2
73	100.0
B	
20m	53.6
+10m	57.0

B = $C_6H_4N_2O_4$.—(*Continued*)

°C	Mol % A
B	
−11m	62.2
A + B	
+ 1mE	59.9
A	
−10m	57.7
+10m	62.4
20m	65.2
AB	
20m	66.2
15m	70.2
10m	73.5
5m	76.0
0m	78.1

B = C_6H_5Br (100)
Bromobenzene

°C	Mol % A
B	
−31	0
−35m	6.4
B + AB	
−32.5E	3.4
AB	
−30	4.8
−25	7.6
−20	10.7
−15	14.1
−10	17.8
− 5	21.7
0	26.6
AB + A	
+ 3U	31.8
AB	
5m	37.1
6m	41.9
6.5m	45.4
7.0m	**50**
A	
10	36.4
20	43.2
30	50.8
40	59.2
50	68.8
60	80.6
65	87.2
70	95.0
73	100.0

B = C_6H_5Cl (100)
Chlorobenzene

°C	Mol % A
B	
−45.2	0
B + AB	
−47E	2.2
AB	
−40	3.6
−30	6.0
−20	9.0
−15	11.6
−10	14.4
− 5	19.4
+ 4m	41.4
AB + A	
0U	28.1

B = C_6H_5Cl.—(*Continued*)

°C	Mol % A
A	
10	32.5
20	38.7
30	47.1
40	56.2
50	66.6
60	78.7
70	94.3
73	100.0

B = C_6H_5F (109)
Fluorobenzene

°C	Mol % A
B	
−39.2	0
B + AB	
−40.5E	1.0
AB	
−35	2.3
−25	5.0
−15	8.1
−10	10.4
− 5	13.2
0	18.1
+ 8m	33.1
10m	**50.0**
AB + A	
5.5U	26.5
A	
15	32.8
25	40.6
35	49.5
45	59.3
55	71.3
65	86.3
73	100.0

B = C_6H_5I (100)
Iodobenzene

°C	Mol % A
B	
−28.6	0
−30.0	2.4
B + AB	
−34.5E	12
AB	
−25	16.4
−15	24.6
− 5	39.1
AB + A	
− 4U	41.5
A	
+ 5	44.5
15	48.7
25	53.9
35	60.1
45	67.5
55	76.2
65	87.4
70	95.0
73	100.0
B	
−40m	22.2
A + B	
−45mE	28.4

B = C_6H_5I.—(*Continued*)

°C	Mol % A
A	
−35m	30.9
−25m	33.9
−15m	37.2
− 5m	40.7
AB	
− 3m	47.2

B = $C_6H_5NO_2$ (100) Nitrobenzene

°C	Mol % A
B	
+ 6	0
+ 2	7.0
− 2	12.1
− 6	16.5
−10	20.3
−14	23.5
−18m	26.2
B + AB	
−16.5E	25.2
AB	
−13.5	27.3
−10.5	29.8
− 7.5	35.2
− 6.5	40.7
− 6.0	**50.0**
AB + A	
− 6.5E	52.7
A	
−15m	50.2
− 5	52.8
+ 5	55.8
15	59.2
25	63.0
35	67.6
45	72.8
55	79.0
65	87.2
70	92.7
73	100.0

B = C_6H_6 (100)

°C	Mol % A
B	
5.6	0
4	2.6
B + A_2B	
1E	7.1
A_2B	
10	10.1
20	13.1
30	16.8
40	21.4
50	27.2
60	34.7
70	45.2
75	53.1
77.5	58.7
79	**66.6**
77.5	73.4
75	78.5
70	83.3
A_2B + A	
62E	89.3

B = C_6H_6.—(*Continued*)

°C	Mol % A
A	
67.5	94.2
73	100.0

B = C_6H_6BrN (106) *p*-Bromoaniline

°C	Mol % A
B	
63.5	0
B + AB_3	
62E	2.1
AB_3	
81	5.4
91	8.9
95.5	11.5
103	18.7
105	23.5
105.5	**25.0**
105	27.3
102	32.9
96	38.2
90	41.6
73	46.0
68	49.8
57	52.0
49	54.4
A	
46	78.6
63	88.6
70	94.7
73	100

B = C_6H_6O (111) Phenol

°C	Mol % A
B	
41	0.0
35	7.4
30	12.5
25	17.0
20	20.8
15	24.3
10	27.5
B + A_2B	
5E	30.3
A_2B	
10	33.6
15	36.9
20	40.5
25	44.7
30	50.2
35	58.7
37	**66.6**
A_2B + A	
36.5E	68.4
A	
45	73.5
55	80.0
60	83.6
65	89.4
70	95.7
73	100.0

B = $C_6H_6O_3S$ (110) Benzenesulfonic acid

B = $C_6H_6O_3S$.—(*Continued*)

°C	Mol % A
B	
52.5	0.0
45	13.1
35	25.1
25	35.1
+ 5m	47.0
− 5m	51.6
B + A	
+13E	43.4
A	
− 5m	38.5
+ 5m	41.2
25	47.6
35	53.1
45	61.0
55	71.8
65	87.0
70	94.5
73	100.0

B = C_6H_7N (112) Aniline

°C	Mol % A
B	
− 6	0
B + AB_4	
− 7.2E	0.5
AB_6	
0m	1.8
+ 7m	3.5
AB_4	
0	1.0
10	2.0
20	3.0
30	4.1
40	5.4
50	6.9
60	8.7
70	10.9
75	13.1
AB_4 + AB_3	
77U	14.7
AB_3	
80	16.3
85	20.5
88	**25.0**
AB_3 + AB_2	
87	26.2
AB_2	
90	27.4
93	29.8
94.5	**33.3**
93	37.2
AB_2 + AB	
89.5	40.1
AB	
95	43.0
98	46.5
100.5	**50.0**
98	55.1
90	59.2
80	62.6
70	65.6
60	68.4
50	71.0
40	73.6

B = C_6H_7N.—(*Continued*)

°C	Mol % A
AB + A	
31E	75.0
A	
40	78.6
50	83.2
60	89.1
70	96.5
73	100.0

B = C_6H_{10} (104) Tetrahydrobenzene

°C	Mol % A
A	
−25	7.9
−15	10.3
− 5	13.3
+ 5	17.5
15	23.0
25	30.0
35	39.0
45	50.3
55	64.9
65	82.9
73	100.0

B = C_6H_{12} (104) Cyclohexane

°C	Mol % A	
B		
6.4	0	
A + B		
6.0E	0.08	
A		
20	0.4	
30	0.9	
40	1.6	
50	2.6	
60	3.8	
Two liquid phases		
70	5.9	92.3
80	8.3	90.2
90	11.3	87.1
100	15.1	82.5
110	20.1	76.1
120	28.3	64.4
124	34.7	54.7
125.5crit.	44.1	
A		
73	100.0	

B = C_7H_5ClO (102) Benzoyl chloride

°C	Mol % A
B	
− 0.5	0.0
− 5	11.8
−10	20.1
−15	26.6
B + A	
−23E	33.3
A	
−15	35.7
− 5	38.6
+ 5	42.1
15	46.3
25	51.4
35	57.7
45	65.5
55	74.7

B = C_7H_5ClO.—(*Continued*)

°C	Mol % A
A	
65	86.6
70	94.6
73	100.0

B = C_7H_5N (105) Benzonitrile

°C	Mol % A
B	
−13.2	0
−16.0	4.9
−25.0m	12.6
B + AB	
−19.0E	8.6
AB	
−10	11.2
0	15.2
+ 5	18.1
10	22.2
15	29.1
20	43.1
21.5	**50.0**
20.0	54.1
AB + A	
15E	63.3
A	
25	67.0
35	71.0
45	75.8
55	82.3
65	91.7
70	96.4
73	100.0

B = C_7H_6O (105) Benzaldehyde

°C	Mol % A
AB	
10	26.3
20	29.5
30	34.0
35	37.0
40	41.5
42	44.5
43.5	**50.0**
42	54.8
40	57.9
35	62.2
30	65.9
AB + A	
+25E	69.1
A	
− 5m	63.7
+ 5m	65.1
15m	66.9
35	72.1
45	76.3
55	81.8
65	89.3
70	96.2
73	100.0

B = $C_7H_6O_2$ (102) Benzoic acid

°C	Mol % A
B	
120	0
110	14.1
100	25.5

B = $C_7H_6O_2$.—(*Continued*)

°C	Mol % A
B	
90	35.0
80	43.4
70	50.8
60	57.5
B + A	
46E	65.6
A	
50	71.0
60	82.0
70	93.3
73	100.0

B = C_7H_7Cl (107) *o*-Chlorotoluene

°C	Mol % A
B	
−36.2	0.0
B + AB	
−37.5E	4.0
AB	
−30	6.4
−20	10.8
−10	18.5
− 5	24.9
+ 2m	44.0
3m	**50.0**
+ 2m	53.7
AB + A	
− 0.5U	34.1
A	
+10	39.1
20	44.2
30	50.4
40	58.6
50	69.0
60	81.0
70	95.3
73	100.0

B = C_7H_7Cl (107) *m*-Chlorotoluene

°C	Mol % A
B	
−47.2	0.0
B + AB	
−49E	4.0
AB	
−40	7.2
−30	12.3
−20	20.2
−10m	37.1
− 9m	41.2
AB + A	
−14U	27.2
A	
0	32.5
+10	37.3
20	43.4
30	51.0
40	59.5
50	69.2
60	81.4
70	95.7
73	100.0

$SbCl_3$.—(*Cont'd*)

B = C_7H_7Cl (107)

p-Chlorotoluene

°C	Mol % A
B	
6.2	0
+ 3	7.4
0	14.4
− 3	20.8
− 6	26.6
B + A	
− 7.5E	30.2
A	
0	33.3
+10	37.8
20	43.7
30	50.6
40	58.9
50	69.7
60	81.3
70	95.7
73	100.0

B = $C_7H_7NO_2$ (107)

o-Nitrotoluene

°C	Mol % A
B	
− 8.5	0
−13.5	7.1
B + AB	
−18.5E	12.0
AB	
−10	14.0
0	17.3
+10	21.2
20	27.7
25	32.3
30	38.3
33	43.1
34.5	**50.0**
33	56.2
30	61.3
AB + A	
27.5E	63.9
A	
10m	58.8
20m	61.5
30	65.3
40	69.8
50	76.1
60	85.1
70	95.6
73	100.0

B = $C_7H_7NO_2$ (107)

m-Nitrotoluene

°C	Mol % A
B	
16	0
+10	10.0
0	20.9
−10	27.8
−20	31.3
vis.	32–55
A	
0	55.2
+20	61.5
30	66.2
40	71.3

B = $C_7H_7NO_2$.—(*Continued*)

°C	Mol % A
A	
50	77.8
60	86.0
70	96.1
73	100.0

B = $C_7H_7NO_2$ (107)

p-Nitrotoluene

°C	Mol % A
B	
52.5	0.0
50	4.4
45	12.0
40	18.2
35	22.9
30	27.3
20	33.3
+10	37.9
0m	41.7
−10m	44.7
B + AB	
+ 7.5E	39.3
AB	
7.5	**50.0**
5	54.0
AB + A	
+ 3E	57.1
A	
−20m	52.0
0m	56.4
+10	58.8
20	61.6
30	65.3
40	70.7
50	76.8
60	85.1
70	95.6
73	100.0

B = C_7H_8 (95)

Toluene

°C	Mol % A
B	
−93	0
B + AB	
−94E	0.5
AB	
−80	0.9
−70	1.4
−60	2.1
−50	3.3
−40	5.1
−30	7.2
−20	10.0
−10	14.4
0	22.1
+ 6	28.6
AB + A_2B	
11U	35.7
A_2B	
− 8m	27.0
+ 1m	31.0
20	40.5
30	47.6
35	52.6
40	59.3

B = C_7H_8.—(*Cont'd*)

°C	Mol % A
A_2B	
41.5	61.4
42.5	**66.6**
41.5	69.4
A_2B + A	
40.0E	71.1
A	
50.0	77.7
60.0	83.8
70.0	94.7
73.0	100.0

B = C_7H_8O (111)

Methyl phenyl ether

°C	Mol % A
B	
−34	0
B + AB	
−36.5E	6.1
AB	
−30	8.3
−20	11.8
−10	15.8
0	20.5
+10	26.4
20	34.8
23	39.1
AB + A_2B	
25U	45.1
A_2B	
30	47.8
35	52.4
40	59.9
41.5	**66.6**
38.5m	73.1
A_2B + A	
40E	72.7
A	
10m	62.1
20m	64.8
30m	68.0
50	78.2
60	84.6
65	88.9
70	96.1
73	100.0

B = C_8H_8O (102)

Acetophenone

°C	Mol % A
B	
19.5	0.0
15	8.1
10	13.7
5	17.8
B + AB	
1E	19.8
AB	
5	20.1
15	22.5
25	24.6
35	27.1
45	31.7
50	35.3
55	39.5
60	46.8

B = C_8H_8O.—(*Continued*)

°C	Mol % A
AB	
60.5	**50.0**
60	53.4
55	59.7
50	63.7
45	67.0
AB + A	
32E	73.5
A	
−20m	60.2
0m	64.0
+20m	69.5
30m	73.1
40	77.2
50	82.5
60	88.5
70	96.7
73	100.0

B = C_8H_{10} (95)

Ethylbenzene

°C	Mol % A
B + AB	
−93E	0.1
AB	
−70	0.3
−50	0.6
−30	1.1
−20	2.1
−10	3.6
0	5.6
+10	9.4
15	12.8
20	16.8
25	21.0
30	27.2
35	36.4
37	41.9
39	**50**
37	57.7
AB + A_2B	
35E	61.6
A_2B	
36	63.0
37	**66.6**
A_2B + A	
36.8E	68.1
A	
40	70.3
50	77.3
60	85.5
65	90.3
70	95.6
73	100.0
A_2B	
15m	37.8
25m	47.5
30m	53.0
AB + A	
33mE	65.7

B = C_8H_{10} (101)

o-Xylene

°C	Mol % A
B	
−29	0
−32	4.4

B = C_8H_{10}.—(*Continued*)

°C	Mol % A
B + AB	
−35E	7.1
AB	
−30	9.0
−20	13.4
−10	18.7
0	26.4
+10	36.4
A_2B + AB	
19.5U	50.0
A_2B	
8	43.0
25	53.7
30	59.0
32.5	63.0
33.5	**66.6**
32.5	68.0
A_2B + A	
31.5E	69.0
A	
40	73.0
50	78.6
55	82.0
60	85.4
65	89.1
68	92.6
71	96.6
73	100.0

B = C_8H_{10} (101)

m-Xylene

°C	Mol % A
B	
−57	0
B + AB	
−60.5E	3.6
AB	
−55	5.0
−45	8.2
−35	12.2
−25	16.5
−15	21.5
− 5	29.1
AB + A_2B	
− 4U	31
A_2B	
+ 5	34.6
15	40.0
25	47.2
30	52.6
33	56.8
36	61.9
38	**66.6**
A_2B + A	
36.5E	70.6
A	
40	72.1
50	76.9
55	79.8
60	83.5
65	87.9
68	91.4
70	94.3
72	98.0
73	100.0

B = C_8H_{10}.—(*Continued*)

°C	Mol % A
AB	
5m	42.2
+ 7.5m	**50.0**
A_2B	
−15m	27.2
− 5m	30.6
A	
+19m	64.3
30m	68.0

B = C_8H_{10} (101)

p-Xylene

°C	Mol % A
B	
14	0
B + AB	
11.7E	5.6
AB	
20	9.0
30	14.4
35	17.8
40	21.8
45	27.0
50	34.0
AB + A_2B	
55U	43.1
A_2B	
60	47.9
65	53.1
67.5	57.9
70	**66.6**
67.5	73.5
65	78.0
61.5	81.5
A_2B + A	
58E	84.4
A	
61.5	86.7
65	90.0
69	94.3
73	100.0
B	
10m	11.2
B + A_2B	
7m	18.6
A_2B	
15m	22.1
25m	27.1
35m	32.2
45m	37.5
AB	
56m	**50**

B = $C_8H_{10}O$ (111)

Phenetole

°C	Mol % A
B	
−28.6	0
B + AB	
−29E	0.7
AB	
−20	2.5
−10	4.5
0	7.1
+10	10.7
20	16.7

B = $C_8H_{10}O$.—(*Continued*)

°C	Mol % A
AB	
25	20.7
30	26.2
35	33.0
40	42.7
42.2	**50.0**
40	54.8
35	64.8
30m	71.6
26m	75.2
AB + A	
33E	67.5
A	
30m	66.0
40	71.6
50	78.2
60	85.9
65	90.5
70	95.3
73	100.0

B = C_9H_{12} [101] Mesitylene

°C	Mol % A
B	
−54.4	0
B + AB	
−55.6E	0.8
AB	
−40	1.6
−30	2.6
−20	3.9
−10	5.4
0	7.8
+10	12.2
20	17.8
30	25.8
35	31.4
AB + A_2B	
38U	35.9
A_2B	
45	38.5
55	43.3
65	50.0
70	55.2
73	59.4
75.5	**66.6**
73	73.1
70	78.1
65	82.1
A_2B + A	
58.5E	87.1
A	
63	89.2
68	93.9
70	96.2
73	100.0

B = C_9H_{12} [95] *n*-Propylbenzene

°C	Mol % A
A_2B	
−70	0.2
−60	0.7
−50	1.5
−40	3.0
−30	5.5

B = C_9H_{12}.—(*Continued*)

°C	Mol % A
A_2B	
−20	9.7
−15	12.7
−10	16.2
− 5	20.5
0	26.2
+ 5	35.6
7	41.6
A_2B + A	
8.5E	53.2
A	
10	53.6
20	56.4
30	60.6
40	65.5
50	72.0
60	81.0
65	86.8
70	95.1
73	100.0
AB	
−70m	0.6
−60m	1.3
−50m	2.8
−40m	5.2
−30m	8.8
−20m	14.8
−15m	19.0
−10m	25.1
− 5m	32.4
0m	43.3
+ 1.5m	**50.0**
AB + A	
1.0mE	51.1
A	
0m	51.0

B = C_9H_{12} [101] Pseudocumene

°C	Mol % A
B	
−57.4	0
−58.5	6.3
B + AB	
−60.0E	10.8
AB	
−45.0	14.1
−35.0	17.0
−25	20.9
−15	26.3
−10	30.3
− 1m	41.8
0m	**50**
AB + A_2B	
− 5U	35.3
A_2B	
−15m	33.1
+ 5	37.5
15	40.0
25	42.9
35	46.6
45	51.8
50	55.2
55	61.8
56	**66.6**
55	71.4

B = C_9H_{12}.—(*Continued*)

°C	Mol % A
A_2B + A	
51E	78.8
A	
55	81.3
60	84.4
65	89.1
70	95.4
73	100.0

B = $C_{10}H_7Br$ [108] α-Bromonaphthalene

°C	Mol % A
B	
+ 3	0.0
B + AB	
− 1E	7.6
AB	
+10	12.0
15	14.7
20	17.7
25	22.4
30	28.6
33	36.7
34.5	**50.0**
33	60.0
AB + A	
31.5E	63.5
A	
40	68.3
50	75.2
55	79.4
60	83.8
65	88.6
70	94.5
73	100.0

B = $C_{10}H_7Cl$ [108] α-Chloronaphthalene

°C	Mol % A
B	
−17	0.0
B + A_2B	
−21E	6.0
A_2B	
−10	8.6
0	11.3
+10	14.5
20	18.8
25	21.8
30	26.2
35	31.9
40	39.8
42.5	45.4
45	53.2
46	60.0
46	**66.6**
A_2B + A	
>46E	68.3
A	
50	72.1
55	77.2
60	82.3
65	88.4
70	95.3
73	100.0

B = $C_{10}H_7Cl$ [108] β-Chloronaphthalene

°C	Mol % A
B	
56	0
50	12.1
45	20.7
40	28.0
35	33.8
30	39.3
20m	48.5
16.5m	50.9
B + AB	
25E	44.3
AB	
28.5	47.6
29.5	**50.0**
29.0	53.1
AB + A	
28.0E	56.0
A	
16.5m	50.9
20.0m	52.2
25	54.5
30	57.4
35	60.8
40	64.7
45	69.0
50	73.6
55	78.4
60	83.5
65	89.2
70	95.7
73	100.0

B = $C_{10}H_7NO_2$ α-Nitronaphthalene [108]

°C	Mol % A
B	
57	0.0
50	10.7
45	17.5
40	22.9
35	27.1
25m	33.0
B + AB	
30E	30.4
AB	
35	37.2
37.5	43.4
39.0	**50.0**
37.5	58.3
AB + A	
34.5E	66.8
A	
30.0	64.7
40.0	69.8
45.0	73.0
50.0	76.5
55.0	80.2
60.0	84.4
65.0	89.4
70.0	95.6
73.0	100.0

B = $C_{10}H_8$ [108] Naphthalene

°C	Mol % A
B	
79.4	0.0
75	9.2
70	17.1
65	23.7
B + A_2B	
59E	29.9
A_2B	
65	34.4
70	39.0
75	44.8
80	51.3
85	61.9
86	**66.6**
85	73.0
80	80.0
75	85.0
70	88.3
A_2B + A	
65E	90.0
A	
70	95.4
73	100.0

B = $C_{10}H_{14}$ [101] *p*-Cymene

°C	Mol % A
B	
−75	0
B + AB	
−76.5E	1.2
AB	
−60	2.9
−50	4.6
−40	6.7
−30	9.3
−20	13.6
−10	20.5
− 5	25.5
AB + A_2B	
− 3.5U	29.2
A_2B	
+10	33.8
20	39.0
30	47.3
35	53.2
A_2B + A	
40U	65.7
A	
0m	50.9
10m	53.9
20m	57.2
30m	61.0
50	71.7
60	80.0
65	85.3
70	93.8
73	100.0

B = $C_{11}H_{16}$ [95] Amylbenzene

°C	Mol % A
AB	
−80	3.0
−70	5.4

B = $C_{11}H_{16}$.—(*Continued*)

°C	Mol % A
AB	
−60	8.4
−50	12.4
−40	17.9
AB + A_2B	
−35E	22.5
A_2B	
−25	29.3
−15	36.6
A_2B + A	
− 5E	45.6
A	
0	46.3
+10	48.8
20	52.5
30	57.3
40	63.4
50	71.4
60	81.7
65	88.0
70	95.5
73	100.0
AB	
−30m	27.3
−25m	**34.4**
−22m	40.7
−20.5m	**50.0**
−22m	54.0
A_2B	
−45m	17.1
−35m	22.8
0m	52.3
+ 5m	60.3
7.5m	**66.6**
AB + A	
−21mE	44.2
A	
−10m	44.9

B = $C_{12}H_{10}$ [103] Diphenyl

°C	Mol % A
B	
70.5	0.0
65	10.0
60	18.8
55	25.5
B + A_2B	
50E	31.1
A_2B	
55	36.0
60	41.8
65	49.4
70	62.0
71	**66.6**
70	71.1
65	80.2
A_2B + A	
57E	84.4
A	
65	89.7
70	95.1
73	100.0

$SbCl_3$.—(*Cont'd*)

B = $C_{12}H_{10}N_2$ (154) Azobenzene

°C	Mol % A
A	
73.0	100.0
A + A_4B	
65.6E	95.0
A_4B	
71.8	92.0
74.2	89.93
79.5	85.00
80.0	83.63
80.7	**80.00**
78.3	75.01
76.1	69.67
65.4	59.97
59.2	50.16
A_4B + B	
50.5E	40.09
B	
54.8	29.93
59.2	19.94
63.1	9.98
68.0	0.0

B = $C_{13}H_{10}O$ (102) Benzophenone

°C	Mol % A
B	
48	0.0
45	6.3
40	13.4
B + AB	
35E	17.7
AB	
45	22.0
55	26.7
65	32.5
70	37.1
75	46.1
76	**50.0**
75	53.5
70	62.3
65	66.8
55	72.3
45	76.6
AB + A	
39E	79.3
A	
10m	69.5
20m	72.2
30m	75.8
40	80.1
50	84.6
60	89.6
70	96.8
73	100.0

B = $C_{13}H_{12}$ (103) Diphenylmethane

°C	Mol % A
B	
26	0
B + A_2B	
22.5E	6.0
A_2B	
30	7.7
40	11.3

B = $C_{13}H_{12}$.—(*Continued*)

°C	Mol % A
A_2B	
50	15.7
60	20.6
70	27.3
80	35.2
85	40.0
90	45.6
95	52.6
98	59.1
100	**66.6**
98	72.6
95	77.4
90	83.0
85	86.4
80	89.0
75	91.2
A_2B + A	
67E	94.3
A	
70	97.0
73	100.0

B = $C_{14}H_{10}O_2$ (154) Benzil

°C	Mol % A
A	
73.0	100.0
68.5	96.45
61.0	90.47
51.0	84.62
37.0	78.24
?	
vis.	75–50
B	
31.0	48.26
54.0	40.0
69.4	30.59
84.0	16.81
94.0	0.0

B = $C_{14}H_{12}$ (154) Stilbene

°C	Mol % A
A	
73.0	100.0
65.2	90.0
A + A_2B	
46.4E	80.0
A_2B	
83.6	75.0
96.3	70.0
97.3	67.98
97.3	**66.6**
88.5	60.00
83.8	58.58
A_2B + B	
75.5E	
B	
80.7	50.00
100.5	32.46
125.0	0.0

B = $C_{14}H_{14}$ (154) Dibenzyl

°C	Mol % A
A	
73.0	100.0
71.2	98.14
68.1	95 03

B = $C_{14}H_{14}$.—(*Continued*)

°C	Mol % A
A + A_4B	
66.4E	
A_4B	
69.4	91.10
74.6	86.11
76.5	83.60
77.3	80.96
77.2	78.71
75.9	74.00
A_4B + A_2B	
74.2E	73.83
A_2B	
74.7	71.25
76.0	67.01
75.6	65.90
72.9	57.45
71.4	53.70
66.4	47.12
59.7	38.29
51.8	32.10
A_2B + B	
43.3E	23.85
B	
48.9	9.66
51.5	0.0

B = $C_{19}H_{16}$ (103) Triphenylmethane

°C	Mol % A
B	
92	0.0
85	12.9
80	20.5
70	33.5
60	44.1
50	51.5
42m	56.0
AB	
48.5m	45.2
49.5m	**50.0**
B + AB	
49.3U	52.0
AB	
48.5	56.4
45.0	64.6
40.0	70.0
AB + A	
35E	73.6
A	
45	77.9
55	83.4
65	91.1
70	96.4
73	100.0

$SbBr_3$

B = $C_2H_4O_2$ (102) Acetic acid

°C	Mol % A
B	
16.5	0.0
15.0	2.3
10	10.2
B + A	
4E	18.5

B = $C_2H_4O_2$.—(*Continued*)

°C	Mol % A
A	
10	20.2
20	23.1
30	26.2
40	30.5
50	35.7
60	43.0
70	52.6
80	69.4
90	90.0
94	100.0

B = $C_6H_4Cl_2$ (100) *p*-Dichlorobenzene

°C	Mol % A
B	
54.5	0
51.5	6.3
B + A	
48.5E	12.8
A	
55	18.7
60	23.5
65	29.5
70	37.0
75	45.6
80	56.2
85	68.9
90	85.2
94	100.0

B = $C_6H_4Br_2$ (100) *p*-Dibromobenzene

°C	Mol % A
B	
88	0
85	6.8
80	18.0
75	29.5
70	41.5
B + A	
65E	52.0
A	
70	59.1
75	66.5
80	74.4
85	83.0
90	91.8
92	95.4
94	100.0

B = $C_6H_4Br_3N$ 2, 4, 6-Tribromoaniline (106)

°C	Mol % A
B	
119	0
110	19.1
100	34.2
90	46.9
80	57.4
70	65.2
B + A	
62	69.9
A	
70	75.7
80	83.4
85	87.7
90	93.2
94	100.0

B = $C_6H_4N_2O_4$ (100) *m*-Dinitrobenzene

°C	Mol % A
B	
90	0
85	8.1
80	16.2
75	24.2
70	31.8
65	38.5
60	44.3
55	49.1
50	53.0
B + A	
47.5E	54.4
A	
50	56.1
55	58.8
60	62.2
65	66.2
70	70.8
75	76.0
80	81.7
85	87.8
90	94.2
94	100.0

B = C_6H_5Br (100) Bromobenzene

°C	Mol % A
B	
−31	0
B + A	
− 32E	2.6
A	
− 25	4.4
− 15	6.9
− 5	9.9
+ 5	13.4
15	17.4
25	22.2
35	27.7
45	34.4
55	42.6
65	52.6
75	65.2
85	81.1
90	90.0
94	100.0

B = C_6H_5Cl (100) Chlorobenzene

°C	Mol % A
B	
−45.2	0
B + A	
−47E	1.7
A	
−40	2.2
−30	3.2
−20	4.3
−10	5.6
0	7.2
+10	9.2
20	11.8
30	15.4
40	20.8

B = C_6H_5Cl.—(*Continued*)

°C	Mol % A
A	
50	28.1
60	37.6
70	50.0
80	66.6
90	89.6
94	100.0

B = C_6H_5F (109) Fluorobenzene

°C	Mol % A
B	
−39.2	0.0
B + A	
−39.5E	0.3
A	
−25	1.0
−15	1.8
− 5	2.7
+ 5	3.7
15	5.1
25	6.9
35	9.3
45	13.0
55	19.3
65	29.2
70	41.7
75	54.1
80	66.3
85	78.8
90	90.4
94	100.0

B = C_6H_5I (100) Iodobenzene

°C	Mol % A
B	
−28.6	0
−30.3	4.0
B + A	
−32E	8.7
A	
−20	13.5
−10	17.5
0	22.7
+10	26.3
20	31.5
30	37.5
40	43.7
50	50.7
60	58.5
70	67.0
80	78.2
90	91.9
94	100.0

B = $C_6H_5NO_2$ Nitrobenzene (100)

°C	Mol % A
B	
6	0
+ 1	8.6
− 4	17.0
− 9	24.0
−17m	31.9
B + A	
−15E	29.7

B = $C_6H_5NO_2$.—(*Continued*)

°C	Mol % A
A	
−5	32.3
+5	35.3
15	38.8
25	42.8
35	47.4
45	52.8
55	59.1
65	66.4
75	74.9
85	86.0
90	93.0
94	100.0

B = C_6H_6 (100)

B	
5.6	0
B + A_2B	
4.5E	1.9
A_2B	
15	3.0
25	4.3
35	6.0
45	8.6
55	12.1
65	17.1
75	24.9
80	30.7
85	38.4
90	48.2
91.5	58.1
92.5	**66.6**
91.5	73.7
90	76.7
A_2B + A	
85E	84.9
A	
90	91.4
92	94.8
94	100.0

B = C_6H_6BrN
p-Bromoaniline (106)

A	
94	100
92	92.0
83	86.0
69	77.5
35	69.0
B	
40	22.1
52	16.1
57	11.5
61.5	4.8
62.5	1.4
63.5	0

B = C_6H_6O (111)
Phenol

B	
41.0	0.0
37.5	3.8
35.0	7.0
32.5	11.1
30.0	14.8

B = C_6H_6O.—(*Continued*)

°C	Mol % A
B + A_2B	
28.5E	17.4
A_2B	
35	20.1
40	22.6
45	26.1
50	30.5
55	37.3
60	45.2
65	58.8
A_2B + A	
66.5E	66.6
A	
75	74.6
85	85.8
90	94.0
94	100.0

B = $C_6H_6O_3S$
Benzenesulfonic acid (110)

B	
52.5	0
50.0	7.6
47.5	13.5
B + A	
44.0E	20.5
A	
50.0	22.2
60.0	26.8
70.0	34.8
75.0	40.5
80.0	48.7
85.0	60.0
90.0	80.7
94.0	100.0

B = C_6H_{10} (104)
Tetrahydrobenzene

A	
−5	3.0
+5	3.3
15	3.8
25	5.1
35	6.8
45	9.3
55	13.7
65	21.9
70	29.4
75	42.3
80	55.7
85	70.0
90	83.1
94	100.0

B = C_6H_{12} (104)
Cyclohexane

B	
6.4	0.0
B + A	
6.0E	0.07
A	
20	0.3
30	0.5
40	0.8
50	1.3

B = C_6H_{12}.—(*Continued*)

°C	Mol % A	
A		
60	1.8	
70	2.2	
80	3.2	
90	4.3	
94	100	
Two liquid phases		
92.5	4.7	90.6
100	6.3	88.7
110	7.6	86.6
120	9.6	84.3
130	11.9	81.7
140	14.5	78.6
150	17.6	74.9
160	21.3	69.1
170	27.9	58.5
173	31.5	53.4
175crit.	39.9	

B = C_7H_5ClO (102)
Benzoyl chloride

B	
−0.5	0
−3	8.6
B + A	
−6E	15.6
A	
+10	21.5
20	25.9
30	31.2
40	37.5
50	44.8
60	53.3
70	64.8
80	77.0
90	89.6
94	100.0

B = C_7H_5N (107)
Benzonitrile

B	
−13.2	0
−16	6.3
−22m	16.3
−27m	21.0
B + AB	
−18E	10.4
AB	
−10	13.7
0	17.8
+10	22.9
20	29.3
30	36.5
35	41.7
38	**50.0**
AB + A	
+35E	57.2
A	
−5m	47.7
+5m	49.3
15m	51.3
25m	54.0
45	61.2
55	66.5
65	73.3
75	81.0

B = C_7H_5N.—(*Continued*)

°C	Mol % A
A	
85	89.3
90	96.5
94	100.0

B = C_7H_6O (105)
Benzaldehyde

AB	
−20	15.4
0	19.7
+10	22.7
20	26.0
30	30.7
35	34.8
40	41.5
41.5	**50.0**
40	56.2
AB + A	
37.8E	61.7
A	
45	64.3
55	68.4
65	73.8
75	80.9
85	89.1
90	94.1
94	100.0

B = $C_7H_6O_2$ (102)
Benzoic acid

B	
120	0.0
115	7.8
110	16.5
105	25.5
100	34.9
95	44.7
90	54.0
85	62.4
B + A	
79E	70.5
A	
85	80.0
90	90.0
94	100.0

B = C_7H_7Cl (107)
o-Chlorotoluene

B	
−36.2	0.0
B + A	
−38.5E	4.1
A	
−30	4.9
−20	6.0
−10	7.4
0	9.2
+10	11.5
20	14.3
30	18.3
40	23.6
50	31.1
60	41.0
70	55.4
80	72.1
90	90.0
94	100.0

B = C_7H_7Cl (107)
m-Chlorotoluene

°C	Mol % A
B	
−47.8	0.0
B + A	
−50E	3.0
A	
−40	3.6
−30	4.4
−20	5.5
−10	6.9
0	8.7
+10	11.0
20	13.7
30	17.3
40	22.4
50	29.6
60	39.2
70	52.8
80	72.1
90	90.0
94	100.0

B = C_7H_7Cl (107)
p-Chlorotoluene

B	
6.2	0.0
4.5	4.5
A + B	
2.5	9.7
A	
10	11.7
20	14.5
30	18.6
40	23.8
50	31.3
60	41.1
70	55.4
80	72.1
90	90.0
94	100

B = $C_7H_7NO_2$
o-Nitrotoluene (107)

B	
−8.5	0.0
−11	4.4
B + AB	
−13.5E	8.5
AB	
−10	9.5
0	12.7
+10	17.5
15	21.1
20	25.9
25	32.2
30	43.3
AB + A	
31U	46.9
A	
30m	46.5
40	51.1
50	56.6
60	63.1
70	70.6

B = $C_7H_7NO_2$.—(*Continued*)

°C	Mol % A
A	
80	79.9
90	93.1
94	100.0

B = $C_7H_7NO_2$
m-Nitrotoluene (107)

B	
16	0
15	2.2
10	10.8
+5	20.1
0	25.2
−5	30.2
B + A	
−9E	33.6
A	
0	35.8
+10	39.0
20	42.4
30	46.2
40	51.1
50	56.6
60	63.1
70	70.6
80	79.9
90	93.1
94	100.0

B = $C_7H_7NO_2$
p-Nitrotoluene (107)

B	
52.5	0
50	5.0
45	13.8
40	21.7
35	28.0
30	32.7
25	36.9
20	40.7
B + A	
16E	43.0
A	
20	44.3
30	48.7
40	53.6
50	59.2
60	65.5
70	72.5
80	81.0
90	93.7
94	100.0

B = C_7H_8 (95)
Toluene

B	
−93	0
B + AB	
−93.5E	0.3
AB	
−80	0.7
−70	1.2
−60	1.8
−50	2.6

$SbBr_3$.—(*Cont'd*)

$B = C_7H_8$.—(*Cont'd*)

°C	Mol % A
AB	
−40	3.7
−30	5.2
−20	8.2
−10	13.3
− 5	17.7
AB + A_2B	
− 1U	22.4
A_2B	
+10	28.8
20	36.7
34m	54.0
A_2B + A	
30U	47.5
A	
40	51.5
50	56.3
60	62.3
70	69.4
80	79.4
85	85.2
90	92.6
94	100.0

$B = C_7H_8O$ (111)
Phenyl methyl ether

°C	Mol % A
B	
−34	0
B + AB	
−35E	0.7
AB	
−30	1.7
−20	3.8
−10	6.3
0	9.8
+10	15.1
15	18.9
20	23.4
25	30.4
29	40.0
30.5	**50.0**
AB + A	
30E	51.0
A	
12m	45.2
20m	47.8
40	55.0
50	59.4
60	64.8
70	73.3
80	81.2
90	93.6
94	100.0

$B = C_8H_8O$ (102)
Acetophenone

°C	Mol % A
B	
19.5	0
15	8.9
10	15.4
5	20.6
AB + B	
1.5E	24.0

$B = C_8H_8O$.—(*Continued*)

°C	Mol % A
AB	
10	26.6
20	30.4
30	36.6
35	42.5
37.5	**50.0**
35	56.8
AB + A	
31E	62.7
A	
40	64.6
50	67.5
60	71.1
70	76.5
80	84.3
90	94.2
94	100.0

$B = C_8H_{10}$ (95)
Ethylbenzene

°C	Mol % A
B + AB	
−93E	0.1
AB	
−70	0.25
−60	0.4
−50	0.6
−40	1.0
−30	1.5
−20	2.3
−10	3.9
0	6.4
+10	9.8
15	13.2
20	19.5
25	28.6
AB + A	
29E	37.8
A	
40	44.6
50	51.6
60	59.8
70	67.4
80	77.4
85	85.0
90	92.6
94	100.0

$B = C_8H_{10}$ (101)
o-Xylene

°C	Mol % A
B	
−29	0
B + AB	
−33E	3.4
AB	
−20	5.7
−10	8.7
0	13.5
+ 5	17.2
10	21.8
15	28.0
20	37.0
24	**50.0**
AB + A	
22.5E	52.0

$B = C_8H_{10}$.—(*Continued*)

°C	Mol % A
A	
0m	46.0
10m	48.6
20m	51.4
30	54.6
40	58.1
50	62.0
60	66.6
70	72.7
80	81.3
90	93.0
94	100.0

$B = C_8H_{10}$ (101)
m-Xylene

°C	Mol % A
B	
−57	0
B + AB	
−59.2E	2.0
AB	
−45	3.4
−35	4.7
−25	6.8
−15	10.0
− 5	15.8
0	20.3
+ 5	27.5
10	38.8
13.5m	**50.0**
AB + A	
13U	47
A	
− 5m	43.5
+ 5m	45.3
15	47.7
25	50.5
35	53.6
45	57.5
55	62.2
65	68.3
75	75.4
85	85.6
90	93.2
94	100.0

$B = C_8H_{10}$ (101)
p-Xylene

°C	Mol % A
B	
14	0
12	5.5
B + A_2B	
10E	10.5
A_2B	
20	14.5
30	18.8
40	24.8
50	33.9
60	45.6
65	55.5
66.5	60.3
67.5	**66.6**
A_2B + A	
66.5E	68.9

$B = C_8H_{10}$.—(*Continued*)

°C	Mol % A
A	
70	71.4
75	75.8
80	81.2
85	86.9
88	91.1
91	95.0
94	100.0

$B = C_8H_{10}O$ (111)
Phenetole

°C	Mol % A
B	
−28.6	0.0
B + AB	
−29E	0.55
AB	
−20	0.9
−10	1.7
0	2.8
+10	4.8
20	7.4
30	12.1
35	16.5
40	22.5
45	32.6
47	40.4
48.8	**50.0**
AB + A	
47E	54.0
A	
10m	37.0
20m	40.9
30m	45.2
40m	50.0
50	55.5
60	62.2
70	70.0
80	80.0
90	92.6
94	100.0

$B = C_9H_{12}$ (101)
Mesitylene

°C	Mol % A
B	
−54.4	0
B + AB	
−55.2E	0.7
AB	
−40	0.9
−30	1.2
−20	1.9
−10	3.2
0	5.9
+10	10.2
20	15.7
AB + A_2B	
29U	26.6
A_2B	
40	28.3
50	35.0
55	39.2
60	44.0
65	51.0
67	55.1

$B = C_9H_{12}$.—(*Continued*)

°C	Mol % A
A_2B	
69	61.1
69.5	**66.6**
A_2B + A	
69E	70.4
A	
61m	64.5
70	71.5
80	81.0
90	94.2
94	100.0

$B = C_9H_{12}$ (95)
n-Propylbenzene

°C	Mol % A
AB	
−80	0.4
−70	0.7
−60	1.2
−50	2.1
−40	3.4
−30	5.5
−20	9.5
−15	12.2
−10	17.2
− 5	24.3
− 1.5m	33.3
AB + A	
− 5E*ca.*	25.0
A	
−20m	23.3
−10m	24.4
0	25.8
+10	27.8
20	30.5
30	34.1
40	38.6
50	44.3
60	51.5
70	61.5
80	73.5
90	90.0
94	100.0

$B = C_9H_{12}$ (101)
Pseudocumene

°C	Mol % A
B	
−57.2	0
B + AB	
−58.8E	3.4
AB	
−50.0	4.0
−40	4.8
−30	6.0
−20	8.3
−10	13.0
− 5	17.1
0	23.2
+ 5	31.8
AB + A_2B	
7U	36.8
A_2B	
−15m	29.4
− 5m	32.5
+ 5m	36.2

$B = C_9H_{12}$.—(*Continued*)

°C	Mol % A
A_2B	
15	40.9
25	47.2
36m	**66.6**
A_2B + A	
33U	56.2
A	
−10m	47.6
0m	49.1
+10m	50.8
20m	52.8
30m	55.2
40	58.2
50	62.0
60	66.8
70	72.8
80	80.6
90	92.7
94	100.0

$B = C_{10}H_7Br$ (108)
α-Bromonaphthalene

°C	Mol % A
B	
+ 3	0.0
0	9.8
B + A	
− 3.5E	20.8
A	
+ 5	23.0
15	26.5
25	31.2
35	36.8
45	43.5
55	51.4
65	60.6
75	70.8
80	77.5
85	84.9
90	92.3
94	100.0

$B = C_{10}H_7Cl$ (108)
α-Chloronaphthalene

°C	Mol % A
B	
−17	0.0
−21	5.9
B + A	
−24.5E	11.6
A	
−20	12.8
−10	15.3
0	18.1
+10	21.3
20	23.9
30	28.3
40	33.9
50	41.9
60	50.2
70	62.0
80	76.0
90	92.0
94	100.0

B = $C_{10}H_7Cl$ (108)
β-Chloronaphthalene

°C	Mol % A
B	
56	0.0
53	7.2
50	14.6
45	22.3
40	31.2
B + A	
37.5E	34.6
A	
40	36.3
45	39.3
50	43.0
55	47.3
60	52.2
65	57.7
70	63.8
75	70.4
80	77.4
85	84.8
90	92.3
94	100.0

B = $C_{10}H_7NO_2$
α-Nitronaphthalene (108)

°C	Mol % A
B	
57	0.0
56	3.6
50	12.6
45	20.1
40	26.6
35	32.1
B + AB	
33.5E	33.4
AB	
35.5	37.9
37.5	45.8
38.2	**50.0**
AB + A	
38E	50.4
A	
40	51.6
50	56.8
60	62.8
70	70.0
80	79.0
90	92.4
94	100.0
AB	
31.5m	28.9
B	
30.0m	36.8
B + A	
23.0mE	43.8
A	
30.0m	46.8

B = $C_{10}H_8$ (108)
Naphthalene

°C	Mol % A
B	
79.4	0.0
75.0	10.0
70.0	17.6
65.0	25.2
60.0	31.7
B + A_2B	
57.0E	35.2
A_2B	
60	42.2
62.5	50.2
65	61.5
66	**66.6**
A_2B + A	
65	69.8
A	
70	72.6
75	75.8
80	80.8
85	86.7
90	94.0
94	100.0

B = $C_{10}H_{14}$ (101)
p-Cymene

°C	Mol % A
B	
−75	0
B + AB	
−77E	0.8
AB	
−70	1.0
−60	1.6
−50	2.9
−40	3.4
−30	5.0
−20	7.5
−10	12.1
0	21.5
+10m	**50.0**
AB + A	
+ 5U	28.3
A	
− 7m	26.5
+20	32.2
30	35.5
40	39.5
50	44.5
60	50.5
70	60.4
80	74.1
90	90.8
94	100.0

B = $C_{11}H_{16}$ (95)
Amylbenzene

°C	Mol % A
AB	
−70	1.9
−60	2.6
−50	3.6
−40	5.1
−30	7.1
−25	9.7
−20	13.4
−15m	19.4
−13m	24.9
AB + A	
−17E	16.4
A	
−10	17.0
0	18.2
+10	19.9
20	22.5
30	25.9
40	30.3
50	35.8
60	43.3
70	54.0
75	60.5
80	68.5
85	78.1
90	90.0
94	100.0

B = $C_{12}H_{10}$ (103)
Diphenyl

°C	Mol % A
B	
70.5	0
65	9.7
60	19.3
55	27.6
50	33.6
B + A_2B	
47E	36.8
A_2B	
50	40.0
55	48.1
57.5	56.6
A_2B + A	
60.5U	66.6
A	
50m	58.0
70	73.0
80	82.0
90	93.8
94	100.0

B = $C_{12}H_{10}N_2$ (154)
Azobenzene

°C	Mol % A
A	
95.0	100.0
85.6	91.08
73.4	80.0
A + A_4B	
72.4U	79.0
A_4B	
72.2	75.00
71.2	70.00
66.7	60.00
60.2	50.00
52.9	42.69
A_4B + B	
52.8E	40.0
B	
55.4	32.79
61.9	15.66
64.2	7.39
68.0	0.0

B = $C_{13}H_{10}O$ (102)
Benzophenone

°C	Mol % A
B	
48	0.0
45	6.2
40	14.4
35	20.4
20	31.4
B + AB	
29E	26.2
AB	
35	29.8
40	33.7
45	39.4
47.5	45.2
48.5	**50.0**
47.5	56.0
45	61.5
AB + A	
40E	66.6
A	
50	70.0
60	74.4
70	79.7
80	85.5
90	94.5
94	100.0

B = $C_{13}H_{12}$ (103)
Diphenylmethane

°C	Mol % A
B	
26.0	0.0
B + A_2B	
22.5E	6.4
A_2B	
30	8.7
40	11.8
50	16.4
60	21.9
70	30.0
75	35.0
80	41.1
85	49.7
88	56.4
90	**66.6**
88	73.7
85	79.7
A_2B + A	
82E	84.5
A	
85	87.4
90	96.6
94	100.0

B = $C_{14}H_{10}O_2$
Benzil (154)

°C	Mol % A
A	
95.0	100.0
86.1	93.10
64.6	75.59
48.0	66.35
A + B	
36.2E	
B	
41.6	55.89
44.1	53.35
66.3	37.77
76.0	27.40
86.1	13.28
94.0	0.0

B = $C_{14}H_{12}$ (154)
Stilbene

°C	Mol % A
A	
94.9	100.0
89.5	90.03
81.7	80.00
81.0	79.20
69.0	70.03
vis.	70–60
A_2B	
101	60.00
102	58.40
94.3	51.18
A_2B + B	
90.0E	40.69
B	
100.0	34.02
104.5	30.28
112.0	21.36
120.0	10.04
125.0	0.0

B = $C_{14}H_{14}$ (154)
Dibenzyl

°C	Mol % A
A	
94.9	100.0
85.1	89.74
A + A_4B	
84.3E	
A_4B	
85.6	85.00
87.1	78.84
84.3	70.00
79.0	60.42
72.2	52.58
63.3	44.88
61.8	43.09
53.0	36.10
43.2	27.00
A_4B + B	
42.8	
B	
46.6	13.96
50.5	3.74
51.5	0.0

B = $C_{19}H_{16}$ (103)
Triphenylmethane

°C	Mol % A
B	
92	0
85	13.0
80	22.5
70	37.4
60	48.8
B + A	
48E	58.1
A	
60	65.2
70	72.4
80	81.1
90	93.4
94	100.0

SbI_3

B = $C_{12}H_{10}$ (103)
Diphenyl

°C	Mol % A
B	
70.5	0
B + A_2B	
68.0E	1.1
A_2B	
80	1.8
90	2.6
100	3.7
110	5.0
120	7.1
130	10.0
140	15.3
145	18.8
150	23.5
155	31.7
160	54.9
161	**66.6**
A_2B + A	
160	81.7
A	
163	92.2
166	100.0

$SiC_{24}H_{20}$

Silicon tetraphenyl
B = $C_{26}H_{20}$ (127)
Tetraphenylethylene

°C	Wt. % B
A	
233	0
A + B	
188.2E	58.5
B	
222.8	100

$SnCl_4$

B = $C_2H_4O_2$ (58)
Methyl formate

°C	Mol % A
AB_2	
− 5	10
+26	15
50.6	20
73	25
80	27.5
82.3	30
83.1	32
83.3	**33.3**
83.2	34
82.9	36
82.5	38
81.7	40
80	43
76.9	47.6
76.2	48.9
74.2	52.3
73.6	53.8
72	56.9
71.2	58
70.4	59.5
68	64

$SnCl_4$.—(*Cont'd*)

B = $C_2H_4O_2$.—(*Continued*)

°C	Mol % A
AB$_2$	
65	70
62.4	74
59.4	78.5
54.4	84
44.4	92.3
38.4	94
A	
−33	100

B = $C_3H_6O_2$ [58, 59]
Ethyl formate

AB$_2$	
−10	10
+15	20
33.5	25.9
46	30.5
48	31.8
49	**33.3**
48.7	33.7
48.6	33.9
47.1	36
45.5	38.3
44	40
38.2	46
32.7	52
28	58
24	65
20	73
16	80
10	90
A	
−33	100

B = $C_9H_{10}O_2$ [58, 59]
Ethyl benzoate

AB$_2$	
16	5
27.5	10
33.8	15
39.5	20
43.3	25
44	27.5
45	30
45.1	31.5
45.3	33
45.5	**33.3**
45.4	33.6
45.3	34
45	36
44.8	38
44	40
43.8	41.5
AB$_2$ + AB	
42E	42.5
AB	
43.4	43.5
44.8	45
47.3	48
47.5	**50**
47.3	52

B = $C_9H_{10}O_2$.—(*Continued*)

°C	Mol % A
AB	
46.4	55
44.5	60
36.7	70
26.5	80
6.0	90
A	
−33	100

SnI_4

B = Various organic compounds [169]

$SnI(CH_3)_3$

B = C_6H_7N [11]
Aniline

°C	Mol % B
AB$_2$	
52	6.88
77	20.11
88	34.21
93.5	50.77
95	60.84
95.2	66.55
94.5	72.22
93	76.2
92	78.96
90.7	81.83

$SnC_{24}H_{20}$

Tin tetraphenyl
B = $C_{18}H_{15}Sb$ [24]
Triphenylstibine

°C	Mol % A
A	
223	100
A + B	
49	*ca.* 1
B	
49.8	0

$PbCl_2$

B = C_5H_5N [38]
Pyridine

AB$_2$	
−20	0.0861
0	0.1036
+22	0.1305
44	0.159
65	0.215
76	0.254
90	0.303
94	0.318
102	0.320

$PbBr_2$

B = C_5H_5N [38]
Pyridine

AB$_3$	
−26	0.222
−10	0.199
− 5	0.183
0	0.174
+13	0.144

B = C_5H_5N.—(*Continued*)

°C	Mol % A
AB$_3$ + AB$_2$	
19U	
AB$_2$	
26	0.127
45	0.144
64	0.174
77	0.211
95	0.289
100	0.313
105	0.338

PbI_2

B = C_5H_5N [38]
Pyridine

B + AB$_3$	
−43.5E	
AB$_3$	
−37	0.0284
−28	0.0289
−20	0.0300
− 9	0.0319
0	0.0343
+ 3	0.0369
AB$_3$ + AB$_2$	
6U	0.0386
AB$_2$	
15	0.0360
35	0.0323
57	0.0326
77	0.0392
92	0.0498
98	0.0584
105	0.0636
108	0.0704
112	0.0764

$Pb(NO_3)_2$

B = C_5H_5N [160]
Pyridine

AB$_4$	
−19.4	0.696
−14.5	0.507
−10.0	0.453
0.0	0.845
+ 5.4	0.930
8.7	1.272
14.72	1.445
19.97	1.595
24.75	2.002
30.03	2.555
34.97	3.05
40.03	3.90
45.00	5.00
49.97	6.65
AB$_3$	
59.52	8.06
70.00	10.15
80.00	12.81
89.93	17.7
94.94	23.5
A$_3$B$_2$	
99.89	25.5
104.90	27.2
109.90	28.2

$Pb(CHO_2)_2$

Formate
B = CH_2O_2 [51]
Formic acid

°C	Mol % A
A	
20	0.21
73.1	0.30
109.4	0.42
124.5	0.51

CdI_2

B = $C_2H_4O_2$ [113]
Methyl formate

A?	
0	0.139
5	0.133
10	0.126
15	0.120
20	0.115
25	0.110
30	0.104

B = C_2H_6O
Ethyl alcohol
[31, 113, 150]

A	
0	5.11
5	7.88
10	10.77
15	11.6
20	12.2
25	11.60
30	11.50
35	11.45
40	11.36

B = $C_3H_6O_2$ [113]
Ethyl formate

A?	
0	0.237
5	0.230
10	0.220
15	0.208
20	0.187
25	0.163

B = C_3H_8O
n-Propyl alcohol
[113, 150]

A?	
0	2.96
5	5.18
10	7.01
15	8.11
20	9.14
25	8.62
30	8.11
35	8.14
40	8.14

B = C_3H_8O [113]
Isopropyl alcohol

A?	
0	8.74
5	8.81
10	8.86
15	8.89
30	8.89

B = $C_4H_8O_2$
Ethyl acetate
[113, 119]

°C	Mol % A
A?	
10	0.397
15	0.416
18	0.441
20	0.439
25	0.462
30	0.484

B = $C_4H_8O_2$ [113]
n-Propyl formate

A	
0	0.580
5	0.555
10	0.523
15	0.488
20	0.439
25	0.380

B = C_5H_5N [113]
Pyridine

A?	
60	0.118
65	0.240
70	0.406
75	0.664
80	1.08
85	1.89
90	4.53
95	5.12

B = C_6H_7N [113]
Aniline

A?	
40	0.386
50	0.594
60	0.807
70	1.045
80	1.32
90	1.67
100	2.30

B = C_9H_7N [113]
Quinoline

A?	
75	1.63
80	1.88
85	2.13
90	2.45
95	2.78
100	3.17

$HgCl_2$

B = CH_4O
Methyl alcohol
[22, 32, 150]

A?	
−34	0.96
−15	1.70
+ 4	3.44
8.5	3.84
12	4.30
20	5.80
25	7.28
38.2	12.7

B = CH_4O.—(*Continued*)

°C	Mol % A
A?	
51	15.7
74	17.5
100	20.5
127	26.3
242.6	0.14
crit.	

B = $C_2H_4O_2$ [32]
Acetic acid

A?	
21	0.61
33	1.15
43	1.39
50	1.57
61	1.89
87	2.66
95	2.93
115	4.05
127	5.24
145	7.30
182	15.15
207	21.40

B = C_2H_6O
Ethyl alcohol
[22, 32, 39, 150]

A?	
−60	0.52
−40	1.81
−20	4.53
−11	5.26
− 5	6.70
0	6.61
+ 8.5	7.08
10	7.21
20	7.46
25	7.81
31	8.09
38.2	8.6
51	9.8
63	11.1
80	13.5
93	15.2
100	16.5
115	20.7
138	26.4

B = C_3H_6O
Acetone [2, 22, 32, 35, 60, 116]
See Fig. 11, p. 212

B = $C_4H_8O_2$
Ethyl acetate [2, 32, 39, 60, 64, 115, 119]
See Fig. 12, p. 213

B = $C_4H_{10}O$
Ether [32, 60]

A?	
−47	0.161
−40	0.168
−20	0.168

B = $C_4H_{10}O$.—(*Continued*)

°C	Mol % A
A?	
0	0.173
+13	0.169
18	0.174
33.5	0.174
83	0.249
100	0.259
115	0.269

B = C_5H_5N (73, 144, 147) Pyridine

°C	Mol % A
AB₂	
−32.8	0.82
−21.9	2.43
+ 0.02	4.22
12.58	5.76
18.78	6.71
23.60	7.42
27.23	7.85
31.05	8.62
40.90	10.75
50.10	13.50
60.03	16.45
70.15	20.20
70.8	19.75
74.6	21.20
75.2	21.36
$AB_2 + AB$	
76U	
AB	
83.5	22.9
86.5	24.3
87.3	24.7
90.4	25.1
97.0	27.4
99.5	27.9
100.5	28.5
104.1	30.5
104.2	31.0
$AB + A_3B$?	
106.2U	
A_3B?	
106.4	32.1
109.8	32.8
113.6	33.2
114.0	33.4
115.7	33.5
118.2	34.2
124.2	35.1
129.4	35.7
145.5	40.1
AB_2	
76.4m	22.0
78.0m	22.4
78.7m	22.8
80.2m	23.6
82.5m	24.3
89.0m	27.5
90.8m	27.9
94.1m	30.3
96.0m	**33.3**

B = C_6H_6 (60, 65)

°C	Mol % A
A?	
11	0.115
15	0.156
38.8	0.229
40.5	0.249
41	0.179
55	0.243
84	0.525

$HgBr_2$

B = C_5H_5N (144) Pyridine

°C	Mol % A
AB_2	
9	4.9
43.5	10.0
57	12.5
68	14.9
89	19.7
106	25.4
115.5	30.4
118	**33.3**
117	33.9
$AB_2 + AB$	
107E	39
AB	
108	39.5
113	41.9
118	43.9
121	46.2
123	**50.0**
$AB + A_3B_2$	
122.5E	52
A_3B_2	
131	54.9
134	**60.0**
133	64.0

B = C_6H_7N (144) Aniline

°C	Mol % A
AB_2	
62.5	4.5
75	6.9
84	9.7
93.5	14.2
100	18.8
106	24.1
109	29.5
109.5	30.6
110	**33.3**
AB	
111	33.9
112	35.3
116	37.3
122	45.5
124	**50.0**
123	55.4
117.7	59.6

B = C_9H_7N (144) Quinoline

°C	Mol % A
AB_2	
88	4.4
111	8.9
127	14.3
134	17.6
148 *ca.*	**33.3**

HgI_2

B = C_5H_5N Pyridine (82, 144)

°C	Mol % A
AB_2	
−50	0.342
−42	0.495
−31.5	0.772
−20	1.36
−10	1.96
− 0.1	2.95
+ 8.83	3.78
10	5.0
20.2	5.32
25.5	6.32
35.28	8.42
42.5	9.8
50.02	11.68
55.05	12.5
60.07	14.0
66.5	15.14
83	19.3
90.08	21.7
102.5	26.3
107	29.6
108	**33.3**
107	34.6
103	38.0
97	43.0
88.5	46.7
$AB_2 + AB$	
87E	47
AB	
89	48.5
90	**50.0**
89	50.6
$AB + A_3B_2$	
88.5E	51
A_3B_2	
93.5	51.3
96	51.6
108	52.7
109	53.2
122	55.4
135	57.9

B = $C_6H_5NO_2$ Nitrobenzene (18, 143)

°C	Mol % A
A (red)	
97.9	0.73
108.0	1.02
118.1	1.32
124.8	1.56
126.5	1.63
128.6m	1.74
130.7m	1.81

B = $C_6H_5NO_2$.—(*Continued*)

°C	Mol % A
A (red) + A (yellow)	
127.5U	1.66
A (yellow)	
116.8m	1.32
123.9m	1.56
126.2m	1.63
128.9	1.74
131.1	1.81
133.1	1.87
144.3	2.46
155.0	3.07
165.8	3.90
173.7	4.63
180.4	5.42
197.0	8.03
214.6	12.04
229.2	18.81
235.9	23.43
244.7	49.57
245.1	72.62
247.0	86.81
250.4	94.41
255.3	100.00

B = C_6H_7N (128) Aniline

See Fig. 13, p. 213

B = $C_7H_7NO_2$ *p*-Nitrotoluene (18, 143)

°C	Mol % A
A (red)	
99.3	0.83
107.8	1.06
119.6	1.47
132.9m	2.08
136.8m	2.29
A (red) + A (yellow)	
128U	1.85
A (yellow)	
92.3m	0.83
103.8m	1.06
118.3m	1.47
134.1	2.08
138.7	2.29
159.3	3.60
179.2	5.67
205.6	9.92
227.3	16.21
233.2	18.97
238.2	23.69
242.5	26.31
247.0	33.00
249.6	41.49
250.8	82.96
251.2	89.57
255.3	100.00

B = C_9H_7N (144) Quinoline

°C	Mol % A
AB_2	
100	4.7
115.5	9.1
130.5	13.2

B = C_9H_7N.—(*Continued*)

°C	Mol % A
$AB_2 + AB$	
138U	23.1
AB	
145	26.7
151	29.8
153	31.4
156	35.4
160	37.7
163	41.6
165	43.0
167	46.1
169	**50.0**
166.5	54.4

$Hg(CN)_2$

B = C_5H_5N (144) Pyridine

°C	Mol % A
AB_6	
9	7.1
11	8.7
12.3	10.1
12.2	10.4
13	11.3
13.5	12.9
14.5	13.8
$AB_6 + AB_3$	
15U	15
AB_3	
16.5	15.8
20.5	15.9
$AB_3 + AB_2$	
22U	17
AB_2	
22.5	17.3
28.5	18.4
32	19.3
38	20.6
42	22.3
45	22.9
46	23.7
$AB_2 + A_2B_3$	
48U	25
A_2B_3	
53	25.3
54.5	26.0
56.5	26.6
$A_2B_3 + AB$	
58U	27
AB	
68	27.5
70	27.7
86	29.0
111	32.0
122.5	33.8
125	34.4
141	38.3
154	**50.0**

B = C_6H_7N (144) Aniline

°C	Mol % A
AB_2	
41	3.7
49	5.7
58.5	7.7

B = C_6H_7N.—(*Continued*)

°C	Mol % A
AB_2	
65	9.2
77	14.2
83.5	18.2
84	19.7
88.5	23.4
AB_4	
26m	4.9
30.5m	5.7
35m	7.7
38.5m	9.2

B = C_9H_7N (144) Quinoline

°C	Mol % A
AB_3	
45	4.2
54	6.0
$AB_3 + AB_2$(?)	
60U	7.5
AB_2(?)	
89	8.2
99	9.2
137	13.2
161	17.4
180	22.5
192	27.1

$Hg(C_2H_3O_2)_2$ Acetate

B = $C_2H_4O_2$ (79) Acetic acid

°C	Mol % A
A	
14.3	0.906
15.0	0.600
16.2	0.296
17.0	0.000

B = C_6H_6O (79) Phenol

°C	Mol % A
A	
− 1.2	17.68
+15.5	13.32
32.0	5.32
42.0	0.00

$HgC_{12}H_{10}$ Mercury diphenyl

B = $C_{18}H_{15}Sb$ (24) Triphenylstibine

°C	Mol % B
A	
121.8	0
A + B	
40.5E	80.5
B	
49.8	100

B = $C_{18}H_{15}Bi$ (24) Triphenylbismuthine

°C	Mol % B
A	
121.8	0
A + B	
63.5E	66.5
B	
76.0	100

$CuCl_2$

$B = C_5H_5N$ (83)
Pyridine

°C	Mol % A
AB_6	
−17.3	0.0824
−13.0	0.107
−12.1	0.115
−11.2	0.131
−10.0m	0.174
$AB_6 + AB_2$	
−10.0U	0.159
AB_2	
− 8.9	0.159
+ 2.0	0.162
10.00	0.1725
25.00	0.205
35.00	0.225
45.00	0.249
49.00	0.273
53.00	0.291
55.00	0.300
60.00m	0.333
61.00m	0.336
62.00m	0.363
$AB_2 + A_2B_3$	
58.00U	
A_2B_3	
63.00	0.320
64.00	0.325
65.00	0.316
70.00	0.335
75.00	0.372
85.00	0.450
95.00	0.542

$Cu(C_2H_3O_2)_2$

Acetate
$B = C_5H_5N$ (81)
Pyridine

°C	Mol % A
AB_4	
−11.6	0.167
+ 2.0	0.262
13.0	0.452
26.45	0.708
37.40	1.255
41.9	1.383
43.2	1.507
45.2m	1.875
$AB_4 + AB$	
44.7U	
AB	
34.8m	1.670
55.7	1.845
64.3	1.922
76.2	2.161
83.3	2.430
95.4	2.850

$AgClO_4$

$B = C_5H_5N$ (77)
Pyridine

°C	Mol % A
B	
−40.3	0
−41 5	1.57

$B = C_5H_5N$.—(*Continued*)

°C	Mol % A
$B + AB_4$	
−43E	2.87
AB_4	
−35	3.33
−11.5	5.04
− 1.3	6.08
+25	9.15
36.1	11.02
49.2	13.70
60.4	16.72
66.8	21.01
$AB_4 + A_4B_9$	
68.0U	21.43
A_4B_9	
71.0	21.91
75.0	22.34
86.3	24.37
$A_4B_9 + AB_2$	
95.6U	25.88
AB_2	
110	27.60

$B = C_6H_6$ (42, 43)

°C	Mol % A
A	
480	100
160	41.8
159	40.8
140m	38.8
A + AB	
145U	39.3
AB	
138.5	36.1
115.5	27.8
92	20.1
80.3	15.16
50	4.06
25	1.95
AB + B	
5.12E	1.32
B	
5.48	0.00

$B = C_6H_7N$ (44)
Aniline

°C	Mol % A
B	
−6.15	0.00
$B + AB_6$	
−6.6E	0.33
AB_6	
25.0	2.30
40.0	5.46
50.1	8.42
60.52	**14.3**
55.0	16.68
$AB_6 + AB_3$	
48.3U	18.1
AB_3	
56.1	19.45
$AB_3 + AB_2$	
66.6U	22.0
AB_2	
88	23.0
A	
480	100.0

$B = C_7H_8$ (44.5)
Toluene

°C	Wt. % A
A	
75	54.60
50	52.68
25	50.30
A + AB	
22.6U	
AB	
18	44.11
+16	42.00
0	26.41
−24.1	6.01
−73.5	0.00

$CoCl_2$

$B = C_5H_5N$ (129)
Pyridine

°C	Mol % A
AB_6	
−50.3	0.2550
−45.0	0.2553
−30.0	0.2566
−19.6	0.2569
−10.0	0.2629
0.0	0.2626
$AB_6 + AB_4$	
+15U	
AB_4	
23	0.347
25	0.350
34.6	0.457
37.6	0.460
44.6	0.582
47.2	0.622
51.0	0.679
55.0	0.729
60.0	0.810
64.2	0.896
68.0	0.964
$AB_4 + AB_2$	
70U	
AB_2	
74.8	1.296
78.2	1.395
79.8	1.490
88.0	2.022
$AB_2 + A$	
90U	
A	
>90	

$AlCl_3$

$B = CCl_4$ (66)

A?	
4	0.54
14	0.16
20	0.11
34	0.043

$B = CHCl_3$ (66)

A?	
−15	0.38
0	0.59
+25	0.42

$B = C_6H_4BrNO_2$
o-Bromonitrobenzene (96)

°C	Mol % A
B	
38.5	0
32	10.9
26	18.5
B + AB	
20E	24.3
AB	
30	26.8
40	29.5
50	32.4
60	35.2
70	38.2
80	41.2
90	44.8
97	48.0
100	**50.0**
97	52.8
90	54.9
AB + A	
80E	56.8
A	
90	57.7
100	58.9
110	60.3
120	62.0
130	64.0
140	66.6
150	69.6
160	73.2
170	78.0
180	84.0
194	100

$B = C_6H_4BrNO_2$
m-Bromonitrobenzene (96)

°C	Mol % A
B	
54.7	0
51	9.5
B + AB	
47E	16.9
AB	
50	18.0
60	22.2
70	26.5
80	30.9
90	35.4
100	40.2
110	45.8
113	47.7
116	**50.0**
113	52.5
107	54.6
AB + A	
97E	57.6
A	
110	59.6
120	61.5
130	63.6
140	66.1
150	69.2
160	73.2

$B = C_6H_4BrNO_2$.—(*Continued*)

°C	Mol % A
A	
170	78.0
180	84.0
190	92.3
194	100

$B = C_6H_4BrNO_2$
p-Bromonitrobenzene (96)

°C	Mol % A
B	
124.5	0
117	10.8
111	18.1
105	24.5
B + AB	
99E	30.2
AB	
110	33.9
120	37.6
130	41.5
140	46.2
143	47.8
145	**50.0**
143	52.9
140	54.6
130	58.5
120	61.2
AB + A	
113E	62.7
A	
120	63.6
130	65.5
140	67.7
150	70.5
160	73.8
170	78.0
180	84.0
190	92.3
194	100

$B = C_6H_4ClNO_2$
o-Chloronitrobenzene (96)

°C	Mol % A
B	
32.5	0
27	11.8
21	18.4
B + AB	
15E	23.1
AB	
25	25.8
35	28.8
45	31.9
55	35.2
65	38.7
75	42.6
85	47.4
89	**50.0**
85	52.8
77	55.7
AB + A	
69E	58.5

$B = C_6H_4ClNO_2$.—(*Continued*)

°C	Mol % A
A	
90	59.7
110	61.9
130	64.5
150	69.0
170	75.6
175	77.6
194	100.0

$B = C_6H_4ClNO_2$
m-Chloronitrobenzene (96)

°C	Mol % A
B	
44.5	0
40	12.4
36	19.0
B + AB	
50E	23.8
AB	
60	27.7
70	31.8
80	36.0
90	40.7
100	46.0
104	**50.0**
100	52.7
90	56.6
AB + A	
81E	59.8
A	
100	61.3
120	63.9
140	67.7
160	73.4
194	100

$B = C_6H_4ClNO_2$
p-Chloronitrobenzene (96)

°C	Mol % A
B	
83.5	0
78	8.3
73	14.6
B + AB	
68E	19.5
AB	
80	25.1
90	30.0
100	35.0
110	40.2
120	45.8
124	48.1
126	**50.0**
124	51.9
120	54.1
110	57.2
100	60.3
AB + A	
94E	62.1
A	
110	63.0
125	64.4
140	66.7
155	70.2

$B = C_6H_4ClNO_2$.—(*Continued*)

°C	Mol % A
A	
170	75.3
180	80.0
185	83.8
190	89.5
193	95.6
194	100

$B = C_6H_5NO_2$ (96) Nitrobenzene

°C	Mol % A
B	
5.6	0.0
4	4.1
$B + AB_2$	
2E	9.5
AB_2	
10	13.5
15	16.8
20	21.1
$AB_2 + AB$	
25.5U	28.8
AB	
35	30.2
45	32.4
55	34.7
65	37.5
75	41.1
85	45.9
88	47.7
90	**50.0**
88	51.7
82	53.6
72	56.0
62	57.8
AB + A	
52E	59.6
A	
70	60.8
90	62.1
110	63.8
130	65.9
160	70.7
180	78.7
194	100.0

$B = C_6H_6$ (92)

°C	Mol % A
A	
17	0.12
80	0.72

$B = C_7H_5ClO$ (97) Benzoyl chloride

°C	Mol % A
B	
− 0.5	0.0
− 4.0	8.3
B + AB	
− 7.5E	13.3
AB	
0.0	14.7
+20.0	19.6
40.0	26.0
60.0	34.2
70.0	38.7
80.0	43.5
90.0	48.3
93.0	**50.0**

$B = C_7H_5ClO$.—(*Continued*)

°C	Mol % A
AB	
90.0	51.8
80.0	54.2
70.0	56.2
60.0	58.2
40.0	62.2

$B = C_7H_7NO_2$ (96) *o*-Nitrotoluene

°C	Mol % A
B	
− 8.5	0
$B + AB_2$	
− 9.3E	1
AB_2	
0	1.6
+10	2.6
20	4.1
30	6.6
40	11.2
50	21.0
$AB_2 + AB$	
55U	31.4
AB	
70	36.3
85	42.4
95	47.5
99.5	**50.0**
90	53.5
70	57.4
AB + A	
45E	62.1
A	
70	63.1
95	65.0
120	68.7
145	74.1
170	81.9
180	86.4
185	89.7
190	94.4
194	100

$B = C_7H_7NO_2$ (96) *m*-Nitrotoluene

°C	Mol % A
B	
16	0
$B + AB_2$	
13E	7.9
AB_2	
20	9.9
27	13.6
34	20.8
$AB_2 + AB$	
35U	24.8
AB	
50	29.5
65	34.5
80	40.2
90	44.8
95	47.4
99.5	**50.0**
90	53.5
70	57.4
AB + A	
45E	62.1

$B = C_7H_7NO_2$.—(*Continued*)

°C	Mol % A
A	
70	63.1
95	65.0
120	68.7
130	70.7
194	100

$B = C_7H_7NO_2$ (96) *p*-Nitrotoluene

°C	Mol % A
B	
52.5	0
47	9.3
42	15.2
B + AB	
37E	19.2
AB	
50	23.9
65	29.5
80	35.3
95	41.9
105	46.9
109	**50.0**
105	52.4
100	54.1
80	58.9
60	62.3
AB + A	
45E	64.6
A	
75	67.0
105	70.0
135	73.9
165	80.4
180	86.3
190	91.4
194	100

$B = C_7H_8$ (92)

°C	Mol % A
A	
17	0.26
73	0.92

$B = C_{13}H_{10}O$ (98) Benzophenone

°C	Mol % A
B	
48	0
44	11.3
B + AB	
39.5E	20
AB	
50	22.3
60	24.5
70	27.0
80	29.8
90	32.9
100	36.3
110	40
120	44.4
125	46.6
130	**50**
125	53.3
120	54.5
110	56.5
100	58.1
90	59.5

$B = C_{13}H_{10}O$.—(*Continued*)

°C	Mol % A
AB	
80	60.9
70	62.2
AB + A	
60E	63.5
A	
80	64.2
100	65.3
120	66.9
130	68.1
140	69.9
150	72.1
160	74.9
170	78.4
180	83.3
185	87.1
190	91.7
192	94.8
194	100.0

$AlBr_3$

$B = CBr_4$ (47, 53)

°C	Mol % B
α-A	
97.1	0.0
96.6	1.0
94.5	2.7
85.7	11.5
72.5	23.0
β-A	
68.5	29.5
56.7	42.5
52.3	47.6
50.2	49.5
44.0	55.9
β-B	
44.7	66.1
46.1	67.6
α-B	
51.7	73.7
68.8	85.5
77.6	90.3
90.1	100.0

$B = C_2H_4Br_2$ (99) Ethylene bromide

°C	Mol % A
B	
10	0
6	8.4
+ 2	16.0
B + A	
− 2E	22.9
A	
+10	28.4
20	33.9
30	40.1
40	47.2
50	55.1
60	63.6
70	72.7
80	82.3
90	92.2
96	100

$B = C_6H_4BrNO_2$ *o*-Bromonitrobenzene (91)

°C	Mol % A
B	
38	0
30	15.7
B + AB	
21E	24.4
AB	
30	27.9
40	31.4
50	34.9
60	38.6
70	42.3
80	46.1
88.5	**50.0**
80	52.9
70	55.2
60	57.5
50	60.0
40	62.4
30	64.9
AB + A	
24E	66.3
A	
30	67.7
40	70.0
50	72.2
60	74.9
70	77.9
80	82.6
85	85.5
90	89.6
93	92.9
96	100

$B = C_6H_4BrNO_2$ *m*-Bromonitrobenzene (91)

°C	Mol % A
B	
54	0.0
50	9.0
B + AB	
45.5E	15.5
AB	
60	20.6
80	28.1
110	42.6
120	48.6
122	**50.0**
120	50.9
100	57.6
80	63.0
60	68.5
AB + A	
42E	73.7
A	
60	75.6
80	80.9
90	88.8
93	92.2
96	100

$B = C_6H_4BrNO_2$ *p*-Bromonitrobenzene (91)

°C	Mol % A
B	
124.5	0
119	7.8
115	15.0
110	20.3
105	24.8
100	28.1
B + AB	
98E	29.2
AB	
110	33.2
120	37.2
130	41.7
140	46.8
144	**50.0**
140	52.5
130	56.2
120	58.9
80	65.7
60	68.4
50	69.9
AB + A	
45E	70.6
A	
50	71.9
60	74.7
70	78.3
80	82.9
85	85.9
90	90.5
93	94.5
96	100

$B = C_6H_4ClNO_2$ *o*-Chloronitrobenzene (91)

°C	Mol % A
B	
32.5	0.0
30	7.1
25	14.1
20	19.6
15	24.8
B + AB	
13.8E	26.1
AB	
30	30.8
40	34.1
50	37.4
60	40.8
70	44.2
80	48.5
83.5	**50.0**
80	51.4
70	54.2
60	57.0
50	59.6
40	62.2
30	64.8
AB + A	
21	67.0
A	
40	71.1
50	73.4

$AlBr_3$.—(*Cont'd*)

B = $C_6H_4ClNO_2$.—(*Continued*)

°C	Mol % A
A	
60	75.8
70	78.2
90	89.3
93	93.2
96	100

B = $C_6H_4ClNO_2$ *m*-Chloronitrobenzene (91)

°C	Mol % A
B	
44.5	0.0
42.0	8.7
40.0	12.0
38.0	15.0
B + AB	
35.5E	18.5
AB	
40.0	20.0
50.0	23.9
60.0	28.0
70.0	32.3
80	36.7
90	41.4
100	47.0
103.5	**50.0**
100.0	52.2
90	56.3
80	59.5
60	64.4
50	66.8
AB + A	
40E	69.0
A	
50	70.9
60	73.0
70	75.7
80	79.7
85	82.8
90	87.3
93	92.0
96	100.0

B = $C_6H_4ClNO_2$ *p*-Chloronitrobenzene (91)

°C	Mol % A
B	
83	0
80	5.5
70	16.3
B + AB	
60E	25.4
AB	
70	29.2
80	33.0
90	37.3
100	41.7
110	47.1
115	**50.0**
110	52.0
100	54.3
80	57.5
60	60.8
40	64.0

B = $C_6H_4ClNO_2$.—(*Continued*)

°C	Mol % A
AB + A	
20E	67.2
A	
40	72.4
60	77.4
70	80.0
80	83.1
90	88.9
93	92.5
96	100.0

B = $C_6H_5NO_2$ (91) Nitrobenzene

°C	Mol % A
B	
+ 5.5	0.0
0	9.2
− 5	15.7
−10	20.8
B + AB	
−15E	25.0
AB	
0	26.7
+20	29.6
30	31.3
40	33.0
50	35.1
70	40.5
80	44.6
85	47.3
87	**50.0**
85	51.8
70	55.0
60	56.6
50	58.3
40	60.0
AB + A	
20E	63.3
A	
30	65.8
40	68.3
50	70.8
70	76.2
80	80.1
93	92.9
96	100

B = C_6H_6 (92)

°C	Mol % A
B	
5.7	0
4.5	3.2
3.0	6.8
A + B	
1.8	9.9
A	
10	13.5
20	20.4
30	29.6
40	40.4
50	50.0
60	58.5
70	67.1
80	75.8
90	85.5
94	91.9

B = C_7H_5ClO (97) Benzoyl chloride

°C	Mol % A
B	
− 0.5	0
− 2.5	6.5
B + AB	
− 5E	13
AB	
+10	17.4
30	24.6
50	31.8
70	40
80	44.3
85	47
90	**50**
80	52.8
60	56
40	59.5
20	63.1
AB + A	
7E	65.5
A	
20	67.9
40	72.6
60	79.4
70	83.9
80	89.2
90	95.8
96	100

B = $C_7H_7NO_2$ (91) *o*-Nitrotoluene

°C	Mol % A
B	
− 8.5	0.0
−10.0	3.5
B + AB_2	
−11.0E	4.6
AB_2	
0	5.4
+10	7.0
20	10.0
30	14.5
40	23.9
AB_2 + AB	
42.5U	32.1
AB	
60	37.8
75	43.0
85	46.7
90	**50.0**
85	53.2
80	54.6
70	56.5
55	59.3
40	62.1
AB + A	
19E	66.1
A	
40	70.6
55	74.3
70	78.3
80	81.7
85	84.4
90	88.5
93	92.2
96	100.0

B = $C_7H_7NO_2$ (91) *m*-Nitrotoluene

°C	Mol % A
B	
16	0.0
12	7.5
8	12.5
4	17.0
B + AB	
1E	20.0
AB	
20	24.8
40	30.5
60	36.5
80	43.0
90	46.9
96	**50.0**
90	53.2
80	55.4
60	59.2
40	63.0
AB + A	
27E	65.8
A	
40	70.0
60	76.6
70	80.3
80	84.8
85	87.4
90	91.3
93	94.7
96	100.0

B = $C_7H_7NO_2$ (91) *p*-Nitrotoluene

°C	Mol % A
B	
53.5	0.0
50.0	5.4
45.0	12.5
40	18.9
35	24.5
B + AB	
29E	30.5
AB	
50	36.6
70	42.8
80	46.6
88	**50.0**
70	55.2
50	60.3
AB + A	
27E	65.8
A	
50	71.7
70	78.6
85	85.8
93	93.7
96	100.0

B = C_7H_8 (92)

°C	Mol % A
A	
−15	6.7
−10	7.1
0	9.7
+10	14.0
20	20.3

B = C_7H_8.—(*Cont'd*)

°C	Mol % A
A	
30	30.4
40	43.0
50	52.9
60	61.3
70	70.0
80	78.5
90	88.5
94	93.9
96	100.0

B = C_8H_{10} (92) *p*-Xylene

°C	Mol % A
B	
14	0
12.5	4.8
A + B	
10.2E	11.8
A	
20	18.1
30	26.5
40	38.5
50	50.7
60	60.8
80	78.3
90	89.2
94	94.7
96	100.0

B = $C_{13}H_{10}O$ (98) Benzophenone

°C	Mol % A
B	
48	0
45	8.5
42	13.8
B + AB	
38E	18.3
AB	
50	21
60	23.4
70	25.7
80	28.1
90	30.6
100	33.4
110	36.3
120	39.6
130	43.2
140	48.4
142	**50**
140	52.1
130	54.5
120	56.7
110	58.6
100	60.3
90	61.7
80	62.9
70	64.1
60	65.1
50	66.0
AB + A	
38E	67.2
A	
50	70.7
60	74.2
70	78.3

B = $C_{13}H_{10}O$.—(*Continued*)

°C	Mol % A
A	
80	83.3
85	86.7
90	90.7
93	94.8
96	100

$MgBr_2$

B = CH_2O_2 (90) Formic acid

°C	Mol % A
AB_6	
0	6.37
20	6.96
40	8.12
60	9.22
70	10.18
80	11.60
86	13.28
88	**14.33**

B = CH_4N_2O (94) Urea

°C	Mol % A
B	
132	0.00
126	1.40
120	2.56
114	3.29
B + AB_6	
108.5E	3.69
AB_6	
115	4.62
120	5.51
125	6.71
127	7.22
130m	10.16
AB_6 + AB_4	
130U	9.90
AB_4	
145	10.42
160	11.86
165	12.79
170	15.68
171	18.86
	20.00

B = CH_4O (87) Methyl alcohol

°C	Mol % A
AB_6	
0	4.37
20	4.63
40	4.89
60	5.18
80	5.51
100	6.07
110	6.46
120	6.85
130	7.30
140	7.81
150	8.34
160	9.00
170	9.77
180	10.9
185	11.6
190	**14.3**

B = $C_2H_4O_2$ (90)
Acetic acid

°C	Mol % A
AB_6	
17	0.033
30	0.166
50	0.50
60	0.89
70	1.86
80	4.66
85	6.17
90	7.32
100	9.5
105	10.80
110	12.44
112	**14.3**

B = C_2H_5NO (93)
Acetamide

°C	Mol % A
B	
82	0.0
70	2.5
60	3.67
B + AB_6	
50.5E	7.06
AB_6	
70	7.32
90	7.73
110	7.98
130	9.41
150	10.77
160	11.72
165	12.52
169	**14.3**

B = C_2H_6O (87)
Ethyl alcohol

°C	Mol % A
AB_6	
0	1.82
10	2.70
20	3.60
30	4.58
40	5.55
50	6.58
60	7.66
70	8.67
75	9.05
80	9.78
85	9.90
90	10.3
95	10.9
100	11.7
103	12.3
106	13.2
108.5	**14.3**

B = C_3H_6O (89)
Acetone

°C	Mol % A
AB_3	
0	0.033
30	0.13
60	0.24
70	0.33
72	0.61
73	0.91
74	2.40
75	9.85
76	15.5

B = C_3H_6O.—
(*Continued*)

°C	Mol % A
AB_3	
80	19.1
84	21.3
88	23.1
92	**25.0**

B = $C_3H_7NO_2$ (94)
Urethane

°C	Mol % A
B	
49	0.00
45	3.17
39	6.45
B + AB_6	
35E	7.73
AB_6	
50	8.19
70	9.30
80	10.30
85	11.03
90	12.45
91.5m	**14.33**
AB_6 + AB_4	
91	13.10
AB_4	
100	13.95
110	15.38
115	16.30
120	17.65
123	**20.00**

B = C_3H_8O (87)
n-Propyl alcohol

°C	Mol % A
AB_6	
0	10.40
10	11.05
20	11.62
30	12.31
40	12.80
43	12.95
46	13.20
48	13.56
50	13.80
52	**14.33**

B = C_3H_8O (87)
Isopropyl alcohol

°C	Mol % A
AB_4	
0	6.58
20	6.81
40	7.11
60	8.01
80	8.92
100	10.10
110	10.82
120	11.85
130	13.36
136	15.7
138	17.3
139	**20.0**

B = $C_3H_8O_2$ (89)
Methylal

°C	Mol % A
AB_2	
20	0.66
40	1.04
60	1.36
80	1.70
100	2.03

B = $C_3H_8O_2$.—
(*Continued*)

°C	Mol % A
AB_2 + two liquid phases	
106	2.49–27.2
AB_2*	
108	29.0
110	31.2
112	**33.3**
AB	
74.7	21.5
107.0	33.3
120.0	
A_3B	
94.7	31.0
95.2	31.1
AB_2 (144, 147)	
18.5	5.9
18.8	6.7
39.5	10.2
52.0	14.1
74.5	21.4
83.0m	25.0
87.0m	27.0
AB_2 + A_xB_y	
91mU	30
A_xB_y	
108	33.1
115.5	35.1
130	38.5
137	41.0
142	43.2
143.5	44.0
A_xB_y + A_3B_2	
145	45
A_3B_2	
159	47.5
173	52.8
180	60.0

*AB_2 + AB_3, 94.7°U.

B = $C_4H_6O_3$ (93)
Acetic anhydride

°C	Mol % A
AB_6	
0	3.49
30	3.97
60	5.02
90	5.97
120	7.86
130	9.62
135	11.9
136.5	**14.3**

B = $C_4H_{10}O$ (87)
Isobutyl alcohol

°C	Mol % A
AB_6	
0	7.44
10	7.97
20	8.68
30	9.41
40	10.10
50	10.73
60	11.33
65	12.67
71	12.29
75	12.98
77	13.36
80	**14.33**

B = $C_4H_{10}O$ (87)
tert.-Butyl alcohol

°C	Mol % A
AB_4	
24.4	0.0093
25	0.15
35	1.50
45	3.10
55	5.36
60	6.89
65	8.80
70	11.25
75	14.39
77.5	15.96
79	17.85
80	**20.00**

B = $C_4H_{10}O$
Ethyl ether (85, 86)

°C	Mol % A	
AB_2		
−8	0.242	
0	0.324	
+10	0.515	
14	0.666	
16	0.786	
18	0.938	
20	1.10	
22	1.32	
AB_2 + two liquid phases		
22.8	1.42–20.5	
AB_2		
23	21.2	
24	22.4	
26	24.1	
28.5	26.0	
AB_2 + AB		
30	26.6	
Two liquid phases		
−10m	0.75	22.5
0m	0.94	21.8
+10m	1.14	21.2
20m	1.36	20.6
30	1.56	20.2
40	1.75	19.9
50	1.95	19.6
60	2.12	19.5
70	2.24	19.6
80	2.33	19.8
90	2.38	19.9
100	2.41	20.1
120	2.33	20.7
140	2.12	21.3
158	1.75	21.9
AB		
170	0.05	
162	0.12	
159	0.56	
158	1.36	
158	1.60	
AB + two liquid phases		
158	1.75–21.9	
AB		
140	22.3	
120	22.9	
100	23.5	
80	24.2	

B = $C_4H_{10}O$.—
(*Continued*)

°C	Mol % A
AB	
60	25.1
40	26.1
30	26.6
20m	27.1
0m	28.1

B = $C_5H_{12}O$ (87)
Isoamyl alcohol

°C	Mol % A
AB_6	
0	9.57
10	10.38
20	11.12
30	11.78
35	12.03
38	12.45
40	12.65
42	13.0
44	13.3
46	**14.33**

B = C_6H_7N (88)
Aniline

°C	Mol % A
AB_6	
10	0.538
30	0.628
50	0.872
70	1.27
90	2.18
100	3.22
103.5m	4.82
AB_6 + AB_4	
103U	4.17
AB_4	
120	4.23
140	4.30
160	4.53
180	4.97
200	5.92
220	8.14
230	10.10
AB_4 + AB_2	
237U	14.59
AB_2	
250	14.80
260	15.00
270	15.14

B = $C_6H_8N_2$ (88)
Phenylhydrazine

°C	Mol % A
AB_6	
20	0.39
40	0.92
60	2.16
80	4.41
AB_6 + AB_4	
99U	7.49
AB_4	
140	8.37
180	9.46
200	10.19

B = C_7H_6O (89)
Benzaldehyde

°C	Mol % A
AB_3	
0	0.15
30	0.26

B = C_7H_6O.—
(*Continued*)

°C	Mol % A
AB_3	
60	0.40
80	0.53
100	0.72
120	1.28
130	2.03
140	3.87
145	7.90
146	15.3
148	20.3
153	23.0
159	**25.0**

B = C_8H_9NO (93)
Acetanilide

°C	Mol % A
B	
112	0.0
110	0.52
108	1.05
B + AB_6	
107.5E	1.23
AB_6	
140	2.65
170	4.09
185	5.39
195	6.83
200	8.33
205	10.3
209	**14.3**

MgI_2

B = CH_4O (87)
Methyl alcohol

°C	Mol % A
AB_6	
0	4.55
20	4.96
40	5.14
60	5.68
80	6.03
100	6.44
120	6.88
140	7.44
160	8.05
180	8.80
200	9.74
	14.3

B = C_2H_3N (93)
Acetonitrile

°C	Mol % A
AB_6	
0	3.49
30	5.03
50	6.20
70	7.68
80	9.18
89	12.18
AB_6 + AB_{6-x}	
	14.30

B = $C_2H_4O_2$ (90)
Acetic acid

°C	Mol % A
AB_6	
20	0.0562
40	0.285
60	0.478
70	0.925
75	1.28

MgI_2.—(*Cont'd*)

B = $C_2H_4O_2$.—(*Continued*)

°C	Mol % A
AB_6	
80	1.86
85	2.80
95	4.62
105	6.28
115	7.86
125	9.29
135	11.25
140	13.05
142	**14.3**

B = C_2H_5NO [93]
Acetamide

B	
82	0.0
70	2.90
58	5.20
B + AB_6	
49E	6.56
AB_6	
80	7.60
110	8.72
130	9.62
150	10.71
160	11.35
170	12.35
175	13.45
177	**14.3**

B = C_2H_6O [87]
Ethyl alcohol

AB_6	
0	2.01
20	3.21
40	4.54
60	5.97
80	7.47
100	9.04
110	9.75
120	10.52
130	11.44
135	12.02
140	12.75
143	13.38
145	13.8
146.5	**14.3**

B = C_3H_6O [89]
Acetone

AB_6	
0	0.46
30	0.64
50	0.79
60	0.98
70	1.47
80	2.59
85	4.32
90	7.02
95	10.3
100	12.7
105	13.9
106.5	**14.3**

B = $C_3H_6O_2$ [93]
Ethyl formate

°C	Mol % A
AB_6	
0	1.62
10	1.88
20	2.23
30	2.76
40	3.59
50	5.13
60	8.64
70.5	**14.3**

B = $C_3H_6O_2$ [93]
Methyl acetate

AB_6	
0	0.040
30	0.056
60	0.077
90	0.094
100	0.18
AB_6 + two liquids	
103	0.25–9.6
AB_6	
110	10.85
120	13.88
121	**14.3**

B = $C_3H_7NO_2$
Urethane [94]

B	
49	0.0
45	3.23
39	5.51
B + AB_6	
32E	6.48
AB_6	
50	7.53
70	9.27
80	10.60
84	11.61
87	**14.3**
$AB_{(6-x)}$	
	<14.3

B = C_3H_8O [87]
Isopropyl alcohol

AB_6	
10	6.67
30	7.11
50	7.60
70	8.17
90	8.84
110	9.69
120	10.25
130	11.25
136	12.58
138	**14.30**

B = $C_4H_8O_2$ [93]
Ethyl acetate

AB_6	
0	0.35
20	0.53
40	0.96
50	1.55
55	2.48
60	4.56
65	8.16
70	12.54

B = $C_4H_8O_2$.—(*Continued*)

°C	Mol % A
AB_6	
75	13.85
78.5	**14.3**

B = $C_4H_{10}O$ [85]
Ethyl ether

AB_2		
5.4	0.39	
11.8	0.66	
15.6	0.95	
18.1	1.50	
20.4	2.12	
22.2	3.28	
AB_2 + two liquids		
23.6	4.33–12.85	
AB_2		
24.5	19.57	
26	21.1	
28	21.6	
31.5	24.2	
35.5	26.4	
40.5	27.3	
45	29.45	
50	32.45	
51	33.0	
Two liquid phases		
15m		12.9
17m		12.8
18.5m	4.02	12.8
25	4.34	12.8
32	4.84	12.8
35	5.34	12.7
37	5.88	12.1
38	6.46	11.5
38.5	8.58	8.58

B = $C_5H_{10}O_2$ [93]
Propyl acetate

AB_6	
0	0.473
20	0.625
30	0.755
35	0.906
40	2.255
45	5.79
50	9.70
55	12.22
60	13.57
65	**14.3**

B = C_6H_7N [88]
Aniline
See Fig. 14, p. 213

B = $C_6H_{12}O_2$ [93]
Isobutyl acetate

AB_6	
0	1.27
20	1.32
40	2.16
50	2.51
60	3.09
70	4.25
75	5.17
80	6.78
85	12.5
87.5	**14.3**

B = $C_6H_{14}O_2$ [89]
Acetal

°C	Mol % A
AB_2	
20	0.034
60	0.104
AB_2 + two liquid phases	
77	0.140–29.6
AB_2	
79	30.4
81	31.2
83	31.6
86	**33.3**

B = C_7H_6O [89]
Benzaldehyde

AB_6	
0	0.38
20	0.45
40	0.62
60	0.92
80	1.36
100	2.25
110	3.34
120	5.06
125	6.91
130	10.2
133	12.1
136	13.5
139	**14.3**

B = $C_7H_{14}O_2$ [93]
Isoamyl acetate

AB_6	
0	0.96
20	1.43
40	2.64
45	3.25
50	4.28
55	6.29
57.5	8.49
60	**14.3**

$CaCl_2$

B = CH_4O [87]
Methyl alcohol

AB_4	
0	5.9
10	6.8
20	7.8
30	8.85
40	10.0
50	11.4
AB_4 + AB_3	
55U	12.2
AB_3	
75	12.9
95	13.7
115	14.9
135	16.6
155	18.4
165	20.1
170	21.0
174	22.5
AB_3 + AB(?)	
177U	25.0

B = CH_4O.—(*Continued*)

°C	Mol % A
AB(?)	
190	26.6
215	28.3

B = $C_2H_4O_2$ [90]
Acetic acid

B	
16.2	0.0
15.0	3.83
14	5.85
13	7.48
B + AB_3	
11.1E	9.58
AB_3	
30	10.7
35	11.3
40	12.5
45	14.6
50	16.3
60	19.0
65	20.6
70	22.3
73	**25.0**

B = C_2H_6O [87]
Ethyl alcohol

AB_3	
0	7.6
20	9.7
40	13.3
60	16.6
70	18.9
80	20.8
85	21.5
90	22.3
95	23.8
97	**25.0**

$CaBr_2$

B = C_2H_6O [19.5]
Ethyl alcohol

°C	g A per g B
AB_4	
0	0.4670
10	0.4801
15	0.5051
AB_4 + AB_3	
17E	
AB_3	
20	0.5350
25	0.5395
30	0.5552
40	0.6011
50	0.6564
60	0.7602
70	0.9381
AB_3 + AB	
73.9E	
AB	
75	1.0220
80	1.0310
85	1.0610

$Ca(CHO_2)_2$

Formate
B = CH_2O_2 [51]
Formic acid

B = CH_2O_2.—(*Continued*)

°C	Mol % A
B	
8.4	0.0
8.1	0.16
7.7	0.48
7.4	0.71
7.2	0.93
6.9	1.27
6.6	1.53
A	
30	1.61
35	1.54
45	1.35
49.7	1.26
61.0	1.10
79.0	0.83
100.0	0.57
128.6	0.39

$BaBr_2$

B = C_2H_6O [19.5]
Ethyl alcohol

°C	g A/g B
A	
0	0.05880
10	0.05067
15	0.04590
20	0.04130
30	0.03322
40	0.02437
50	0.01833
60	0.01479
70	0.01253

$BaBaI_2$

B = C_2H_6O [19.5]
Ethyl alcohol

A	
0	0.7775
10	0.7735
20	0.7700
30	0.7660
40	0.7620
50	0.7585
60	0.7550
70	0.7510

$Ba(CHO_2)_2$

Formate
B = CH_2O_2 [51]
Formic acid

°C	Mol % A
B	
8.4	0.0
7.2	0.91
6.1	1.74
5.1	2.30
2.6	3.73
+ 0.5	4.67
− 0.3	5.12
B + A	
− 4.9E	6.95
A	
+ 9.5	8.52
15.5	8.86
19.0	9.23
24.9	9.83

B = CH_2O_2.—(*Continued*)

°C	Mol % A
A	
26.5	10.03
31.8	10.75

LiCl

B = C_2H_6O (151)
Ethyl alcohol

°C	Mol % A
AB_4	
0	13.5
5	14.1
10	15.5
15	16.9
17	18.1
AB_4 + A	
17.4U	20.7
A	
20	20.8
30	21.5
40	21.6
50	21.0
60	20.3

B = C_9H_7N (161)
Quinoline

°C	Mol % A
AB_2	
0	0.459
25	1.067
40	1.845
45	3.060
50	3.280
56.4	3.460
67	3.635
75	2.430
96	1.380

LiBr

B = C_2H_6O (19.5)
Ethyl alcohol

$LiCHO_2$

Formate
B = CH_2O_2 (51)
Formic acid

°C	Mol % A
B	
8.4	0.0
7.0	1.58
5.2	3.47
3.2	5.33
+ 1.1	7.09
− 1.3	8.93
− 3.5	10.75
− 5.6	12.23
− 8.2	13.99
−14.6	18.19
−17.1	19.56
−19.8	21.25
−23.5m	23.49
−25.0m	24.33
B + A	
−21.7E	22.24
A	
+18.0	23.49
34.0	23.93
80.0	25.31
90.5	25.91

B = CH_2O_2.—(*Continued*)

°C	Mol % A
A	
97.9	26.38
113.1	27.71
131.2	29.87
145.1	31.98
150.4	33.04
159.1	35.01
163.5	36.13

NaBr

B = C_2H_6O (19.5)
Ethyl alcohol

°C	g A per g B
A	
0	0.02445
10	0.02379
15	0.02343
20	0.02322
25	0.02314
30	0.02292
40	0.02276
50	0.02259
60	0.02312
70	0.02345

NaI

B = C_2H_6O (22, 41, 151)
Ethyl alcohol

°C	Mol % A
A?	
10	11.85
30	11.98
50	12.02
80	12.12
100	12.18
120	12.20
160	12.12
180	11.97
200	11.45
220	10.70
230	9.54
240	9.10
250	7.45
255	6.20
260	3.19
261.5 crit.	2.57

If the alcohol content exceeds m = 365 g l^{-1} the tube is completely filled below the crit. temp. At this point the curve displays a sharp change in direction. For alcohol content below m, complete vaporization takes place below the crit. temp. and the curve goes over sharply into the sol. curve for the vapor.

B = C_6H_6O.—(*Continued*)

Mol % A in vapor containing m_B g l^{-1} of B

A

m_B	262°	270°	280°
1	0.153	0.153	0.153
2	0.642	0.642	0.642
3	1.54	1.54	1.51
3.65	2.57	2.53	2.42
4	3.44	3.41	3.27
4.5	5.04	4.95	4.83
4.8	6.21		

m_B	290°	300°	310°
1	0.153	0.153	0.153
2	0.642	0.642	0.642
3	1.48	1.45	1.425
3.65	2.40	2.31	2.25
4	3.12	3.04	2.90

B = C_3H_6O (78)
Acetone

$NaCHO_2$

Formate
B = CH_2O_2 (51)
Formic acid

°C	Mol % A
B	
8.4	0.0
7.5	1.04
5.3	2.92
3.0	4.61
+ 0.4	6.35
− 3.8	8.72
− 7.6	10.50
B + AB_2	
−12.8E	12.58
AB_2	
−17.4	14.52
+ 0.3	16.45
10.7	18.18
22.9	20.69
24.4	21.13
26.3	21.86
30.5	23.23
33.1	24.43
34.5	24.91
AB_2 + AB	
36U	25.7
AB	
31.0m	25.18
37.3	25.90
45.2	27.00
45.6	27.10
52.2	28.39
59.0	29.80
65.1	31.15
67.5	31.65
69.6	32.14
AB + A	
72U	33.3
A	
45.1m	29.80
63.6m	31.65
81.2	33.40
99.3	35.71
118.6	39.10
135.2	42.79

B = CH_2O_2.—(*Continued*)

°C	Mol % A
137.7	43.47

$NaC_2H_3O_2$

Acetate
B = $C_2H_4O_2$ (51)
Acetic acid

°C	Mol % A
B	
16.5	0.0
16.1	0.83
14.3	3.59
B + AB_2	
13.1E	5.40
AB_2	
25.3	7.11
36.7	8.92
54.3	12.17
66.9	15.27
71.9	16.58
85.7	21.55
93.2	26.86
96.1	30.22
96.25	33.03
AB_2 + AB	
96.3U	33.33
AB	
112.0	34.03
132.3	36.87
145.2	39.06
157.0	42.54
160.6	44.25
162.3	46.28
AB + A	
164U	48
A	
174.4	48.76
195.5	49.49

$NaC_{16}H_{31}O_2$

Palmitate
B = $C_{16}H_{32}O_2$ (30)
Palmitic acid
See Fig. 15, p. 213

KI

B = CH_4O (22, 25, 39, 152, 157, 158)
Methyl alcohol
See Fig. 16,* p. 213

* As can be seen from Fig. 16, the data of different authors fall into three groups. The lowest solubility corresponds to (152); the highest to (25). The data of five different authorities over a slight temperature interval, arranged in a mean curve, give a somewhat greater solubility than (152). Different water content may be responsible for this discrepancy.

$KCHO_2$

Formate
B = CH_2O_2 (51)
Formic acid

°C	Mol % A
B	
8.4	0.0
7.4	0.97
4.9	3.02
+ 2.3	4.73
− 0.9	6.36
− 5.7	8.43
−12.6	10.74
−18.7	12.63
−23.8	13.88
B + AB_3(?)	
−31.5E	15.57
AB_3(?)	
−29.0	16.32
−27.3	16.62
−23.5	17.44
−21.7	18.10
−19.5	18.88
AB_3 + AB_2	
−18U	19.5

B = CH_2O_2.—(*Continued*)

°C	Mol % A
AB_2	
−19.0	19.44
−16.0	19.91
− 8.0	21.21
− 0.6	22.79
AB_2 + AB	
+ 5U	24
AB	
−10.1m	23.04
+ 7.3	24.14
29.9	25.90
53.0	28.56
65.1	30.41
72.9	31.97
80.6	33.74
93.0	37.29
96.1	38.34
103.2	41.68
104.3	42.63
104.6	42.91
107.5	45.95
108.6	**50.00**
108.2	51.49
107.2	54.24
103.4	58.47
101.6	61.14
AB + A	
98.7E	63.14
A	
108.1	66.45
114.0	68.71
122.3	71.24
130.7	75.18
135.8	77.75
143.6	82.41
150.0	86.68
157.3	91.24
167.5	100.0

KCNS

B = C_5H_5N (60, 156)
Pyridine
See Fig. 17, p. 213

Part II. Fragmentary Data

For arrangement, *v.* p. 185

In the few cases where the investigator has definitely determined the exact nature of the solid phase present, this is indicated by "c" following the formula of the crystalline phase, or by "crys." Supersaturation with respect to another crystalline phase (usually some compound between solvent and solute) is indicated by the letter "m." Critical solution temperatures are marked "c."

For convenience in use all values where possible have been reduced to Mol %, even though such reduction involves a possible loss in accuracy in instances where reliable density data were not available. For possibly more accurate values in volume units, and for other values at the same or other temperatures, the reader should therefore consult the literature cited.

B = CCl_4, Carbon tetrachloride

A = solute	°C	Mol % A	Lit.
SnI_4	22.4	1.345	(74)
	50	3.37	(74)
$HgCl_2$	19	0.0011	(147)
$HgBr_2$	19	0.00128	(147)

B = CCl_4, Carbon tetrachloride.—(*Continued*)

A = solute	°C	Mol % A	Lit.
HgI_2	19	0.0203	(147)
HgI_2 (yellow)	75	0.0319	(147)
$Hg(CN)_2$	19	0.00061	(147)
OsO_4	20	0.155	(162)

Ca soaps of various fats, *v.* (138)

B = CS_2, Carbon disulfide

Ca soaps of various fats (138)

B = $CHCl_3$, Chloroform

A = solute	°C	Mol % A	Lit.
NH_4Cl	25	0.0	(130)
NH_4Br	25	0.0	(130)
SnI_4	28	1.68	(74)
$HgCl_2$	19	0.047	(147)
$HgBr_2$	19	0.0418	(147)
HgI_2	20	0.0105	(29)
HgI_2 (yellow and red)	61	0.0427	(147)

B = $CHBr_3$, Bromoform

A = solute	°C	Mol % A	Lit.
$HgCl_2$	19	0.451	(147)
$HgBr_2$	19	0.475	(147)
HgI_2	19	0.270	(147)
$Hg(CN)_2$	19	0.00501	(147)

B = CH_2O_2, Formic acid

A = solute	°C	Mol % A	Lit.
$Zn(CHO_2)_2$(c)	140	0.16	(51)
$Cu(CHO_2)_2$(c)	140	0.10	(51)
$Ni(CHO_2)_2$(c)	140	0.10	(51)
$Mg(CHO_2)_2$(c)	25	0.20	(51)

B = CH_3NO_2, Nitromethane

A = solute	°C	Mol % A	Lit.
LiI	0	0.481	(157)
	25	0.997	(157)
NaI	0	0.120	(157)
	25	0.169	(157)
KI	0–25	0.115	(157)
RbI	0	0.142	(157)
	25	0.133	(157)

B = CH_4O, Methyl alcohol

A = solute	°C	Mol % A	Lit.
NH_4NO_3	20	6.40	(22)
NH_4Cl	25	2.074	(22, 41)
NH_4ClO_4	25	1.83	(164)
NH_4Br	25	4.025	(22, 41)
$Pb(NO_3)_2$	20.5	0.132	(22)
$ZnSO_4$	18	0.13	(22)
$ZnSO_4.7H_2O$	17m	6.15m	(22)
$CdCl_2$	15.5	0.300	(22)
CdI_2	20	16.3	(150)
$HgBr_2$	25	5.82	(39)
HgI_2	25	0.23	(232, 39)
HgI_2 (yellow)	36	0.456	(147)
$Hg(CN)_2$	25	5.61	(22, 39)
$CuCl_2$	22	12.2	(32)
	60	12.5	(32)
$CuSO_4$	18m	0.211m	(22)
$CuSO_4.5H_2O$	3.5m	1.685m	(22)
	18	1.965	(22)
AgCl	Room	8.1×10^{-13}	(123)
AgBr	Room	4.4×10^{-15}	(123)
AgI	Room	6.1×10^{-18}	(123)
$AgNO_3$	19	0.67	(22)
$Pt_x(NO_2)_y(C_aH_bS_c)_z$	25	*v.* Lit.	(27)
$CoSO_4$	18m	0.216m	(22)
$CoSO_4.7H_2O$	3.5	4.65m	(22)
	18.5	5.86	(22)
$NiSO_4$	18	0.104	(22)

B = CH_4O, Methyl alcohol.—(*Continued*)

A = solute	°C	Mol % A	Lit.
$NiSO_4.6H_2O$	18.5	3.70	(22)
$NiSO_4.7H_2O$(c)	4	2.74m	(22)
	20	5.38	(22)
$(UO_2)(NO_3)_2.6H_2O$	11	0.27	(125)
$Mg(ClO_4)_2$	25	6.92	(164)
$MgSO_4$	18m	0.312m	(22)
$MgSO_4.7H_2O$	3.5	3.64	(22)
	17m	4.95m	(22)
$Ca(ClO_4)_2$	25	35.3	(164)
$Ca(NO_3)_2$(c)	25m	27.0	(29)
$SrCl_2.6H_2O$	6.5	7.04	(22)
$Sr(ClO_4)_2$	25	19.2	(164)
$Sr(NO_3)_2$(c)	25	0.193	(29)
$BaCl_2$	15.5	0.335	(22)
$BaCl_2.2H_2O$	6–7	0.95	(22)
$Ba(ClO_4)_2$	25	17.11	(164)
$BaBr_2$	240.7c	0.044	(25)
$BaBr_2.2H_2O$	9	4.04	(22)
	15	4.20	(22)
$Ba(NO_3)_2$	25	0.062	(29)
LiCl	1	4.0	(62)
	23	11.4	(62, 151)
	50	17.6	(62)
$LiClO_4$	25	35.4	(164)
$LiClO_4.3H_2O$	25	23.8	(164)
LiI(c)	25	42.0	(151)
NaCl	19.5	0.76	(22)
NaCl(c)	25	0.71	(41, 151)
	241.1c	0.55	(25)
$NaClO_4$	25	11.82	(164)
NaBr	25	5.43	(22, 41)
	245c	0.28	(25)
NaI (crys. AB_3)	25	16.2	(22, 41, 151)
$NaNO_2$	19.5	2.01	(22)
$NaNO_3$	20 and 25	0.155	(22)
1, 3, 4-$C_6H_3(NO_2)_2ONa.H_2O$	25	0.98	(33)
KCl	25	0.226	(22, 39, 151)
	240c	0.0	(25)
$KClO_3$	0	0.0145	(13)
	20	0.025	(13)
$KClO_4$	25	0.0243	(164)
KBr	25	0.573	(22, 39, 151)
	241.2c	0.54	(25)
KCN	19.5	2.36	(22)
1, 3, 4-$C_6H_3(NO_2)_2OK$	25	0.52	(33)
RbCl	25	0.372	(151)
$RbClO_4$	25	0.0104	(164)
$CsClO_4$	25	0.0128	(164)

B = C_2Cl_4, Tetrachloroethylene

A = solute	°C	Mol % A	Lit.
$HgCl_2$	25	0.00443	(45)

B = C_2HCl_3, Trichloroethylene

A = solute	°C	Mol % A	Lit.
$HgCl_2$	25	0.0133	(45)

B = C_2HCl_5, Pentachloroethane

A = solute	°C	Mol % A	Lit.
$HgCl_2$	25	0.0144	(45)

B = $C_2H_2Cl_2$, Dichloroethylene

A = solute	°C	Mol % A	Lit.
$HgCl_2$	25	0.040	(45)
HgI_2 (yellow and red)	85.5	0.261	(147)

B = $C_2H_2Cl_4$, Tetrachloroethane

A = solute	°C	Mol % A	Lit.
$HgCl_2$	25	0.0537	(45)

B = C_2H_3N, Methyl cyanide

A = solute	°C	Mol % A	Lit.
$Hg(CN)_2$	18	1.54	(121)
$CuCl_2$	18	0.491	(121)
Cu_2Cl_2	18	2.69	(121)
$CuBr_2$	18	4.33	(121)
Cu_2Br_2	18	0.55	(121)
Cu_2I_2	18	0.38	(121)
$AgNO_3$	18	41.4	(121)
$CoCl_2$(crys. AB_2)	18	1.27	(121)
NaI	0	0.117	(157)
	25	0.163	(157)
KI	0	0.569	(157)
	25	0.502	(157)

B = $C_2H_4Br_2$, Ethylene bromide

A = solute	°C	Mol % A	Lit.
$HgCl_2$	19	1.047	(147)
$HgBr_2$	19	1.20	(147)
HgI_2	19	0.308	(147)
$Hg(CN)_2$	19	0.00074	(147)

B = C_2H_5I, Ethyl iodide

A = solute	°C	Mol % A	Lit.
HgI_2	19	0.699	(147)

B = CH_4N_2O, Urea

NH_4NO_3 Eutectic at 46.9°C and 48.27 Mol % A (155)

B = C_2H_3N, Methyl cyanide

A = solute	°C	Mol % A	Lit.
NH_4CNS	18	3.90	(121)
KCNS	18	4.56	(121)
RbI	0	0.36	(157)
	25	0.33	(157)

B = $C_2H_4O_2$, Acetic acid

A = solute	°C	Mol % A	Lit.
$Zn(C_2H_3O_2)_2$(c)	130	0.10	(51)
$Fe(C_2H_3O_2)_3$	140	0.0	(51)
$Ca(C_2H_3O_2)_2$(c)	30	0.35	(51)

B = $C_2H_4O_2$, Methyl formate

A = solute	°C	Mol % A	Lit.
HgI_2 (yellow and red)	37	0.154	(147)

B = C_2H_3Cl, Chloroethylene

A = solute	°C	Mol % A	Lit.
$HgCl_2$	25	0.45	(45)

B = C_2H_5Br, Ethyl bromide

A = solute	°C	Mol % A	Lit.
$HgCl_2$	19	0.802	(147)
$HgBr_2$	19	0.697	(147)
HgI_2	19	0.154	(147)
HgI_2 (red)	38	0.185	(147)
$Hg(CN)_2$	19	0.00561	(147)

B = C_2H_6O, Ethyl alcohol

A = solute	°C	Mol % A	Lit.
NH_4Cl	25	0.579	(22, 41)
NH_4ClO_4	25	0.744	(164)
NH_4Br	25	1.515	(22, 41)
	78	4.70	(31)
NH_4NO_3	20	2.16	(22)
BiI_3	20	0.283	(37)
$Pb(NO_3)_2$	20.5	0.0056	(22)
$CdCl_2$	15.5	0.382	(22)
	244.6c	0.382	(25)
$CdBr_2.4H_2O$	15	3.42	(31)
$CdX_2(C_{20}H_{21}NO_4.HX)_2$. (X = halogen) Papaverines, *v.*			(166)
$HgBr_2$(c)	25	3.69	(39)

B = C_2H_6O, Ethyl alcohol.—(*Continued*)

A = solute	°C	Mol % A	Lit.
HgI_2	25	0.225	(22, 40)
HgI_2 (yellow)	78	0.436	(147)
$Hg(CN)_2$(c)	19.5	1.81	(22)
	25	1.90	(39)
$CuCl_2$	0	13.8	(32)
(crys. AB)	25	15.0	(22, 32, 36)
	50	19.6	(32)
$CuSO_4.5H_2O$	3	0.205	(22)
AgCl	Room	1.03×10^{-13}	(123)
AgBr	Room	3.7×10^{-15}	(123)
AgI	Room	6.3×10^{-19}	(123)
$AgNO_3$	19	0.83	(22)
$NH_2(CH_3)_2PtCl_6$	0		(16)
$NH(CH_3)_3PtCl_6$	0		(16)
$2Fe_2O_3.5SO_3.18H_2O$, β-Copiapite	25	0.74	(165)
$Fe_2(SO_4)_3.H_2SO_4.8H_2O$	25	3.34	(165)
$CoCl_2$	Room	16.6	(17)
$CoSO_4.7H_2O$	3	0.40	(22)
$NiSO_4.7H_2O$	3	0.232	(22)
	17	0.352	(22)
$YtCl_3$	20	12.8	(84)
$NdCl_3$	20	7.56	(84)
$Mg(ClO_4)_2$	25	4.71	(164)
$MgSO_4.7H_2O$	3	0.245	(22)
$Ca(ClO_4)_2$	25	35.5	(164)
$Ca(NO_3)_2$	25	23.2	(29)
$SrCl_2.6H_2O$	6.5	0.66	(22)
$Sr(ClO_4)_2$	25	22.5	(164)
SrI_2	−20	0.36	(32)
	+ 4	0.43	(32)
	82	0.60	(32)
$Sr(NO_3)_2$(c)	25	0.0044	(29)
$Ba(ClO_4)_2$	25	14.56	(164)
$BaBr_2$	22.5	0.48	(22)
$Ba(NO_3)_2$	25	0.0009	(29)
$(C_6H_2(NO_2)_3O)_2Ba$, Picrate (crys. $A.5H_2O$)	25	0.54	(33)
$BaC_{14}H_6N_4O_{14}$, 3-5-Dinitrosalicylate	25	0.39	(33)
LiCl	25	21.8	(151)
$LiClO_4$	25	39.6	(164)
$LiClO_4.3H_2O$	25	17.25	(164)
LiI(c)	25	46.3	(151)
$C_{11}H_{23}COOLi$, Laurate	15	0.123	(146)
$C_{13}H_{27}COOLi$, Myristate	15	0.0532	(146)
$C_{15}H_{31}COOLi$, Palmitate	15	0.0210	(146)
$C_{17}H_{33}COOLi$, Oleate	15	0.202	(146)
$C_{17}H_{35}COOLi$, Stearate	15	0.0106	(146)
NaCl(c)	25	0.51	(22, 41, 151)
$NaClO_4$	25	5.22	(164)
NaBr	25	1.63	(41)
	19.5	0.98	(22)
$NaNO_2$	19.5	0.207	(22)
$NaNO_3$	25	0.0195	(22)
CH_3COONa	Room	1.0	(17)
p-$NO_2C_6H_4ONa.4H_2O$	25	1.64	(33)
1, 3, 4-$C_6H_3(NO_2)_2ONa.H_2O$	25	0.77	(33)
$C_6H_2(NO_2)_3ONa.H_2O$, Picrate	0	0.63	(33)
	25	1.09	(33)

$B = C_2H_6O$, Ethyl alcohol.—(*Continued*)

A = solute	°C	Mol % A	Lit.
1, 3, 4-$C_6H_3ClNO_2ONa.H_2O$	25	0.20	(33)
Na_2CrO_4	25	0.10	(22)
KCl(c)	25	0.0136	(22, 151)
$KClO_3$	0	0.00176	(12)
	21	0.00300	(12)
$KClO_4$	0	0.00195	(12, 13, 149)
	25	0.00399	(164)
KBr	25	0.053	(22, 151)
KI	−98	0.315	(124)
	0	0.414	(157)
	25	0.564	(22, 61, 151, 157)
KCN	19.5	0.62	(22)
$C_6H_2(NO_2)_3OK$, Picrate	25	0.40	(33)
$C_9H_6IO_2K$, β-Iodocinnamate	15	0.58	(48)
$C_9H_6IO_2K$, β-Iodoallocinnamate	15	2.70	(48)
RbCl	25	0.030	(151)
$RbClO_4$	25	0.0022	(164)
$CsClO_4$	25	0.0022	(164)
Cs_2CO_3	19	1.55	(23)
	80	2.76	(23)

$B = C_2H_6O_2$, Glycol

A = solute	°C	Mol % A	Lit.
$CuSO_4.5H_2O$	14.6	2.01	(125)
$CoCl_2$(c)	3	5.42	(125)
LiCl	15	15.4	(125)
KI	0.0	14.39	(157)
	25	15.55	(157)

$B = C_3H_5ClO$, α-Epichlorohydrin

A = solute	°C	Mol % A	Lit.
HgI_2 (yellow and red)	117	1.230	(147)

$B = C_3H_5ClO$, Epichlorohydrin

A = solute	°C	Mol % A	Lit.
$N(CH_3)_4CNS$	25	0.396	(159)

$B = C_3H_5N$, Ethyl cyanide

A = solute	°C	Mol % A	Lit.
NaI	0	2.65	(157)
	25	1.82	(157)
KI	0	0.143	(157)
	25	0.134	(157)
RbI	0	0.086	(157)
	25	0.099	(157)

$B = C_3H_6O$, Acetone

A = solute	°C	Mol % A	Lit.
NH_4ClO_4	25	1.084	(164)
$SbCl_3$	18	57.8	(116)
$BiCl_3$	18	3.21	(116)
$Bi(NO_3)_3$	0	12.25	(60)
	19	9.55	(60)
$SnCl_2$	18	14.2	(116)
$SnCl_2.2H_2O$	0	2.83	(60)
	35.5	2.83	(60)
$ZnCl_2$	18	15.6	(116)
$CdBr_2$	18	0.329	(116)
CdI_2	18	3.8	(116)
HgI_2	− 1	0.359	(60)
	+18	0.428	(60)
	40	0.564	(60)
	58	0.769	(60, 147)
$CuCl_2$	18	1.23	(116)
	22	0.963	(125)
	56	0.603	(60)
$CuCl_2.2H_2O$	0–14	2.945	(60)
$AgNO_3$	14–60	0.12	(60, 116)

$B = C_3H_6O$, Acetone.—(*Continued*)

A = solute	°C	Mol % A	Lit.
$FeCl_3$	18	18.4	(116)
$CoCl_2$	0	3.89	(60)
	22.5	3.98	(60)
	25	3.72	(57, 116)
$CoCl_2.2H_2O$	0–25	5.65	(60)
$(UO_2)(NO_3)_2.6H_2O$	12	0.176	(125)
$B(OH)_3$	20	0.47	(40)
$Mg(ClO_4)_2$	25	10.03	(164)
$Ca(ClO_4)_2$	25	20.5	(164)
$Ca(NO_3)_2$	25	33.3	(29)
Ca soaps of various fats, *v.* (138)			
$Sr(ClO_4)_2$	25	28.0	(164)
$Sr(NO_3)_2$(c)	25	0.0055	(29)
$Ba(OH)_2$	25	0.0035	(40)
$Ba(ClO_4)_2$	25	17.74	(164)
$Ba(NO_3)_2$	25	0.0011	(29)
LiCl	0	5.93	(60)
	25	5.32	(60)
	46	4.91	(60)
	58	2.85	(60)
$LiClO_4$	25	42.5	(164)
$LiClO_4.3H_2O$	25	25.79	(164)
$LiNO_3$	18	2.53	(136)
NaCl	20	0.0	(40)
$NaClO_4$	25	19.68	(164)
$C_6H_3(NO_2)_2ONa.H_2O$, 3, 4-Dinitrophenolate	25	0.38	(33)
KCl	20	0.0	(40)
$KClO_4$	25	0.0652	(164)
KBr	25	0.0098	(57)
KI	0	0.746	(60, 157)
	25	0.459	(57, 157)
	56	0.420	(60)
KCNS	22	11.05	(60)
	58	10.85	(60)
$C_6H_3(NO_2)_2OK$, 3, 4- Dinitrophenolate	25	0.36	(33)
$RbClO_4$	25	0.0299	(164)
RbI	0	0.33	(157)
	25	0.23	(157)
CsCl	25	0.011	(35)
$CsClO_4$	25	0.0375	(164)

$B = C_3H_6O_2$, Methyl acetate

A = solute	°C	Mol % A	Lit.
$HgCl_2$	18	10.4	(118)
$HgBr_2$	18	4.31	(118)
HgI_2 (red)	58	0.405	(147)
$CuCl_2$	18	0.303	(118)
$CoCl_2$	18	0.283	(118)
$CoBr_2$	18	3.35	(118)
$Ca(NO_3)_2$	18	23.9	(118)

$B = C_3H_6O_2$, Ethyl formate

A = solute	°C	Mol % A	Lit.
HgI_2 (red)	54	0.349	(147)

$B = C_3H_7OH$, Isopropyl alcohol

A = solute	°C	Mol % A	Lit.
HgI_2 (yellow and red)	81	0.299	(147)

$B = C_3H_7OH$, *n*-Propyl alcohol

A = solute	°C	Mol % A	Lit.
NH_4Cl	25	0.252	(41)
NH_4ClO_4	25	0.197	(164)
NH_4Br	25	0.727	(41)
$HgCl_2$	25	5.42	(41)
$HgBr_2$	25	2.84	(41)

B = C_3H_7OH, *n*-Propyl alcohol.—(*Continued*)

A = solute	°C	Mol % A	Lit.
$Mg(ClO_4)_2$	25	16.45	(164)
$Ca(ClO_4)_2$	25	38.5	(164)
$Ca(NO_3)_2$	25	17.4	(29)
$Sr(ClO_4)_2$	25	22.7	(164)
$Sr(NO_3)_2$	25	0.0057	(29)
$Ba(ClO_4)_2$	25	11.89	(164)
LiCl	25	18.7	(151)
$LiClO_4$	25	37.1	(164)
$LiClO_4.3H_2O$	25	12.04	(164)
LiI (crys. AB_4)	25	17.6	(151)
NaCl(c)	25		(151)
	25		(41)
$NaClO_4$	25	2.37	(164)
NaBr	25		(20, 41)
	25	0.00221	(20)
NaI(c)	25		(41, 151)
KCl(c)	25	0.00321	(151)
$KClO_4$	25	0.00433	(164)
KBr	25	0.0177	(151)
KI	25		(20, 151)
	25	0.00112	(20)
RbCl	25	0.0074	(151)
$RbClO_4$	25	0.0019	(164)
RbI	25	0.076	(20)
	25	0.00048	(20)
$CsClO_4$	25	0.0015	(164)

B = $C_3H_8O_3$, Glycerol: a = sp. gr. 1.2326, b = sp. gr. 1.2645

A = solute	°C	Mol % A	Lit.
NH_4Cl	25	15.44	(40)
	20	17.8ab	(46)
NH_4Br	20	23.05a	(46)
	20	20.35b	(46)
$(CH_3COO)_2Pb$	20	26.7a	(46)
	20	28.8b	(46)
$HgCl_2$	20	15.35a	(46)
	20	20.4b	(46)
$Hg(CN)_2$	15.5	8.98	(22)
$CuSO_4.5H_2O$	15.5	13.6	(125)
$B(OH)_3$	25	25.9	(40)
$Ca(OH)_2$	25	0.198	(40)
$[C_3H_5(OH)_2.OPO_3]_2Ca$, Glycerophosphate	20	0.993a	(46)
	20	0.956b	(46)
NaCl	25	11.40	(40)
	20	14.04a	(46)
	20	11.55b	(46)
NaBr	20	28.6a	(46)
	20	25.7b	(46)
Na_2CO_3	20	48–52a	(46)
	20	40–47b	(46)
$NaHCO_3$	20	4.25ab	(46)
$Na_2C_3H_7PO_6.5\frac{1}{2}H_2O$, Glycerophosphate	20	27.5a	(46)
	20	28.2b	(46)
C_6H_5COONa	20	16.7a	(46)
	20	15.4b	(46)
$Na_2B_2O_7$	20	28.6a	(46)
	20	33.6b	(46)
KCl	25	7.82	(40)
$KClO_3$	20	0.982a	(46)
	20	0.774b	(46)
KBr	25	12.08	(40)
	20	13.75a	(46)
	20	11.75	(46)

B = $C_3H_8O_3$, Glycerol.—(*Continued*)

A = solute	°C	Mol % A	Lit.
KI	15.5	18.16	(60)
	20	24.5a	(46)
	20	21.9b	(46)
K_2CO_3	20	21.3b	(46)
	20	20.75b	(46)
$KOOCCH_3$	20	42.0a	(46)
	20	38.1b	(46)
KCN	15.5	31.15	(140)

B = $C_4H_8O_2$, Ethyl acetate

A = solute	°C	Mol % A	Lit.
NH_4ClO_4	25	0.024	(164)
$SbCl_3$	18	2.24	(119)
$BiCl_3$	18	1.62	(119)
$SnCl_2$	18	2.04	(119)
$SnCl_2.2H_2O$	− 2	10.55	(60)
	22	12.15	(60)
	82	22.2	(60)
$HgBr_2$	18	3.09	(119)
	25	3.82	(39)
HgI_2	− 2	0.288	(60)
	18	0.294	(39, 60, 119)
	40	0.489	(60)
	55	0.614	(60)
HgI_2 (red)	76	0.818	(60, 147)
$Hg(CN)_2$	25	0.70	(39)
$CuCl_2$	18	0.26?	(115)
	20	2.0	(32)
	40	1.7	(32)
	72	0.86	(32)
$CoCl_2(c)$	14	0.054	(60)
	79	0.17	(60)
$(UO_2)(NO_3)_2.6H_2O$	10.5	0.93	(32)
$Mg(ClO_4)_2$	25	21.89	(164)
$Ca(ClO_4)_2$	25	32.3	(164)
$Sr(ClO_4)_2$	25	25.2	(164)
$Ba(ClO_4)_2$	25	22.80	(164)
$LiClO_4$	25	44.0	(164)
$LiClO_4.3H_2O$	25	15.83	(164)
NaCl	17	0.36	(65)
	40	0.60	(65)
$NaClO_4$	25	6.48	(164)
$KClO_4$	25	0.00095	(164)
$RbClO_4$	25	0.00076	(164)
$CsClO_4$	25	0.000	(164)

B = C_4H_9Cl, Isobutyl chloride

A = solute	°C	Mol % A	Lit.
HgI_2 (yellow)	69	0.0668	(147)

B = C_4H_9OH, *n*-Butyl alcohol

A = solute	°C	Mol % A	Lit.
NH_4ClO_4	25	0.011	(164)
$Mg(ClO_4)_2$	25	17.54	(164)
$Ca(ClO_4)_2$	25	37.6	(164)
$Sr(ClO_4)_2$	25	22.6	(164)
$Ba(ClO_4)_2$	25	11.35	(164)
LiCl	25	18.4	(163)
$LiClO_4$	25	35.3	(163, 164)
$LiClO_4.3H_2O$	25	11.15	(164)
NaCl	25	0.018	(163)
$NaClO_4$	25	1.11	(163, 164)
	116	4.73	(163, 164)
NaBr	25	0.00120	(20)
$KClO_4$	25	0.0045–0.0016*	(163, 164)

* Wt % A.

B = C_4H_9OH, *n*-Butyl alcohol.—(*Continued*)

A = solute	°C	Mol % A	Lit.
KI	25	0.00037	(20)
$RbClO_4$	25	0.0008	(164)
RbI	25	0.0002	(20)
$CsClO_4$	25	0.0019	(164)

B = $C_4H_{10}O$, Isobutyl alcohol

A = solute	°C	Mol % A	Lit.
NH_4ClO_4	25	0.0800	(164)
HgI_2 (yellow)	106	0.395	(147)
$Mg(ClO_4)_2$	25	13.10	(164)
$Ca(ClO_4)_2$	25	23.2	(164)
$Ca(NO_3)_2$(e)	25	13.1	(29)
$Sr(ClO_4)_2$	25	16.8	(164)
$Sr(NO_3)_2$(e)	25	0.0035	(29)
$Ba(ClO_4)_2$	25	11.00	(164)
$LiClO_4$	25	28.8	(164)
$LiClO_4.3H_2O$	25	9.68	(164)
$NaClO_4$	25	0.474	(164)
NaBr	25	0.186	(20)
$KClO_4$	25	0.00268	(164)
KI	25	0.056	(20)
$RbClO_4$	25	0.0016	(164)
RbI	25	0.022	(20)
$CsClO_4$	25	0.0022	(164)

B = $C_4H_{10}O$, Ethyl ether

A = solute	°C	Mol % A	Lit.
NH_4Br	15	0.093	(22)
NH_4ClO_4	25	0.000	(164)
$C_{12}H_{22}O_4Pb$		gA/l	
Caproate	B. P. sat.	13.64	(122)
$C_{14}H_{26}O_4Pb$	20	2.40	(122)
Heptylate	B. P. sat.	14.90	(122)
$C_{16}H_{30}O_4Pb$	20	0.938	(122)
Caprylate	B. P. sat.	5.460	(122)
$C_{18}H_{34}O_4Pb$	20	1.115	(122)
Nonylate	B. P. sat.	2.404	(122)
$C_{20}H_{38}O_4Pb$	20	0.290	(122)
Caprate	B. P. sat.	4.285	(122)
$C_{24}H_{46}O_4Pb$, Laurate*	B. P. sat.	0.205	(122)
$C_{28}H_{54}O_4Pb$, Myristate*	B. P. sat.	0.555	(122)
$C_{32}H_{62}O_4Pb$, Palmitate*	B. P. sat.	0.261	(122)
$C_{36}H_{70}O_4Pb$, Stearate*	B. P. sat.	0.000	(122)
The above soaps in petroleum ether, *v.* (122)			
		Mol % A	
$CdBr_2.4H_2O$	15	0.086	(31)
CdI_2	0	0.0304	(65)
	20	0.0507	(65)
HgI_2 (red)	0	0.102	(60)
	35		(60, 147)
$CuCl_2$	Room	0.0237	(17)
$CuCl_2.2H_2O$	Room	0.0265	(17)
$AgNO_3$	19	0	(22)
$CoCl_2$(e)	Room	0.0128	(17)
$CoCl_2.6H_2O$	Room	0.091	(17)
$(UO_2)(NO_3)_2.6H_2O$	12.5	0.89	(125)
$Mg(ClO_4)_2$	25	0.097	(164)
$Ca(ClO_4)_2$	25	0.137	(164)
Ca soaps of various fats, *v.* (138)			
$Sr(ClO_4)_2$	25	0.000	(164)
$Ba(ClO_4)_2$	25	0.000	(164)
$LiClO_4$	25	44.2	(164)
$LiClO_4.3H_2O$	25	0.0907	(164)
$NaClO_4$	25	0.000	(164)
$KClO_4$	25	0.000	(164)
$RbClO_4$	25	0.000	(164)
$CsClO_4$	25	0.000	(164)

* Insoluble at 20°C.

B = $C_4H_4O_2$, Furfural

A = solute	°C	Mol % A	Lit.
LiI	25		(157)
NaI	25	16.9	(157)
KCl	25	0.1095	(139)
KBr	25	0.112	(157)
KI	25	2.915	(157)
RbI	25	1.94	(157)

B = C_5H_5N, Pyridine

A = solute	°C	Mol % A	Lit.
$ZrCl_4$	19	6.77	(26)
$CuCl_2$	18.8	13.1	(147)
AgI	10	0.034	(60)
	121	2.81	(60)
$YtCl_3$	15	2.56	(84)
$PrCl_3$	15	0.68	(84)
$NdCl_3$	15	0.568	(84)
$SaCl_3$	15	1.98	(84)
LiCl	15	12.0	(60)
	100	20.8	(60)
KCl	10	0.000	(139)
KI	10	0.124	(60)
	119	0.0524	(60)

B = $C_5H_{10}O_2$, Propyl acetate

A = solute	°C	Mol % A	Lit.
$Hg(CN)_2$	25	1.72	(39)

B = $C_5H_{11}NO_2$, Ethylurethane

A = solute	°C	Mol % A	Lit.
NH_4Cl	60	0.210	(146.5)
NH_4I	60	5.73	(146.5)
NaCl	60	0.192	(146.5)
NaBr	60	4.11	(146.5)
KCl	60	0.1197	(146.5)
KBr	60	0.277	(146.5)
KI	60	3.23	(146.5)
RbBr	60	0.292	(146.5)
RbI	60	1.67	(146.5)

B = $C_5H_{12}O$, Isoamyl alcohol

A = solute	°C	Mol % A	Lit.
HgI_2	13	0.127	(60)
	71	0.704	(60)
	100	1.015	(60)
	133.5	1.813	(60)
$Ca(NO_3)_2$	25	7.61	(29)
$Sr(NO_3)_2$	25	0.0012	(29)
LiCl	25	15.8	(151)
LiI(e)	25	42.5	(151)
NaCl	25	0.0030	(151)
NaBr	25	0.1	(20)
	25	0.0006	(20)
NaI	25	8.56	(151)
KCl(c)	25	0.0009	(151)
KBr	25	0.00222	(151)
KI	25	0.0494	(20, 151)
	25	0.00031	(20)
KCNS	13	0.164	(60)
	65	1.22	(60)
	100	1.93	(60)
	133.5	2.78	(60)
RbCl	25	0.00182	(151)
RbI	25	0.022	(20)
	25	0.00014	(20)

B = $C_6H_5NO_2$, Nitrobenzene

A = solute	°C	Mol % A	Lit.
$BaCl_2$	20	0.0082	(66)
	50	0.016	(66)
	100	0.020	(66)

B = C_6H_6, Benzene

A = solute	°C	Mol % A	Lit.
SnI_4	20.2	1.775	(74)
CdI_2	16	0.100	(65)
	35	0.200	(65)
HgI_2	15	0.038	(60)
	60	0.151	(60)
	65	0.168	(60)
	84	0.211	(60)
(Yellow)	80	0.143	(147)
$AgNO_3$	35	0.101	(65)
	40.5	0.203	(65)
Ca soaps of various fats, *v.* (138)			

B = C_6H_{14}, *n*-Hexane

HgI_2 (yellow)	67	0.0137	(147)

B = $C_6H_{14}O_2$, Acetal

HgI_2 (yellow)	105	0.518	(147)

B = C_7H_5N, Benzonitrile

$CdCl_2$	18	0.0355	(120)
$CdBr_2$	18	0.325	(120)
CdI_2	18	0.457	(120)
$Hg(CN)_2$	18	0.444	(120)
$AgNO_3$	18	38.9	(120)

B = C_7H_6O, Benzaldehyde

KI	25	0.210	(157)

B = $C_7H_6O_2$, Salicylaldehyde

KI	0	0.806	(157)
	25	0.356	(157)

B = $C_{11}H_{12}N_2O$, Antipyrine

$Zr(NO_3)_4$, AB_6 melts 217–218°			(55)
$Th(NO_3)_4$, A_2B_5 melts 168–169°			(55)
$Yt(NO_3)_3$, AB_4 melts 176–177°			(55)
$La(NO_3)_3$, AB_3 melts 161–162°			(55)
$Ce(NO_3)_3$, AB_3 melts 165°			(55)
$Sa(NO_3)_3$, AB_3 melts 177–178°			(55)
$Er(NO_3)_3$, AB_4 melts 175–176°			(55)

B = $C_7H_8O_2$, Anisaldehyde

KI	0	1.114	(157)
	25	0.528	(157)

PART III

THREE-COMPONENT SYSTEMS

For abbreviations, *v.* p. 4

Solubility of CdI_2 in Mixed Solvents (114)

A = CH_3OH, B = $CHCl_3$, C = C_2H_5OH, D = C_6H_6, E = C_5H_5N, Mol % of CdI_2 in mixed solvent having molal composition shown

t, °C	A + B	A + 2B	B + C	2B + C	C + D	2C + D	C + 2D
0	5.63	2.96	3.53	2.06	5.65	10.45	5.57
16.8	5.60	2.78	3.64	1.94	5.62*	11.32†	5.11
36.8	5.10	2.47	3.43	1.80	5.6		4.73

t	57.9°	60.3°	66.7°	70.6°	71.5°	71.5°
D + E	0.385	0.476	1.276	2.45	3.60	4.47
t	71.6°	72.25°	72.5°	72.5°	78.9°	90.4°
D + E	5.36	7.06	7.92	9.44	12.80	13.78
t	50.1°	53.9°	58.1°	62.45°	64.2°	64.5°
B + E	0.348	0.470	1.13	1.67	2.61	3.67
t	62.5°	61.15°	67.3°	85.5°	89.7°	
B + E	6.44	8.16	10.23	12.95	13.74	

*t = 15.7°. †t = 15°.

A = $HClO_4$
B = $KClO_4$
C = CH_3OH (13)

Wt. % A	g B per l C 0°	g B per l C 20°
0.0	0.495	0.747
0.4		0.216
0.8	0.093	0.177
2.4		0.1225

A = $HClO_4$
B = $KClO_4$
C = C_2H_5OH (12)

0.0	0.047	0.080
0.05	0.019	0.046
0.10	0.020	0.040
0.15	0.018	0.035
0.20	0.018	0.031
0.30	0.019	0.040

A = H_2SO_4
B = Na_2SO_4
C = C_2H_5OH (30.5)

A = $HgCl_2$
B = C_2H_5OH
C = $(C_2H_5)_2O$ (1)
t = 18°C?

Wt. % A	Wt. % B
A	
32.43	67.57
35.50	58.59
37.39	51.02
37.96	44.79
38.24	38.69
37.75	32.84
36.29	27.16
34.08	22.48
28.55	15.20
20.67	8.97
5.49	0.00

A = $HgCl_2$
B = NaCl
C = C_2H_5OH (34)
t = 25°C

A + B	
46.86	3.02

A = $HgCl_2$
B = KCl
C = C_2H_5OH (34)
t = 25°C

Wt. % A	Wt. % B
A + $A_6B_5C_2$	
33.745	0.245
$A_6B_5C_2$	
24.84	0.22
6.21	0.28
$A_6B_5C_2$ + B	
1.42	0.27

A = $HgCl_2$
B = KCl
C = $(CH_3)_2CO$ (34)
t = 25°C

A + A_5BC	
61.87	1.27
A_5BC	
60.68	1.39
56.59	2.33
55.85	2.58
A_5BC + $A_6B_5C_2$	
54.62	2.78
$A_6B_5C_2$	
48.13	2.93
38.94	2.82
18.04	2.51
13.26	2.34
$A_6B_5C_2$ + B	
10.99	2.92

A = $HgCl_2$
B = CsCl
C = $(CH_3)_2CO$ (35)
t = 25°C

Wt. % A	Wt. % B
A	
57.74	0.00
A + A_5B	
57.77	0.14
A_5B	
57.74	0.20
52.54	0.22
49.83	0.32
A_5B + A_2B	
44.39	0.47
A_2B	
39.65	0.48
28.48	0.48
A_2B + AB	
27.14	0.57
AB	
21.50	0.46
Mix.	
13.08	0.45
0.16	0.19
0.17	0.25
0.02	0.11
B	
0.00	0.032

A = HgI_2
B = KI
C = $(CH_3)_2CO$
(130.5)

A = $CuCl_2$
B = KCl
C = C_2H_5OH (36)
t = 25°C

AB + B	
1.39	0.28
AB	
2.15	
5.25	
30.16	
AB + AC	
34.30	0.21
AC	
33.97	0.00

A = $CuCl_2$
B = KCl
C = $(CH_3)_2CO$ (36)
t = 25°C

AB + B	
0.34	0.38
AB	
0.48	
1.50	
2.06	
AB + AC	
2.40	0.27

A = $AgNO_3$
B = C_2H_5OH
C = $(C_2H_5)_2O$ (31)
t = 15°C
1B + 1C by vol. dissolves 1.575 Wt. % A
2B + 1C by vol. dissolves 2.25 Wt. % A

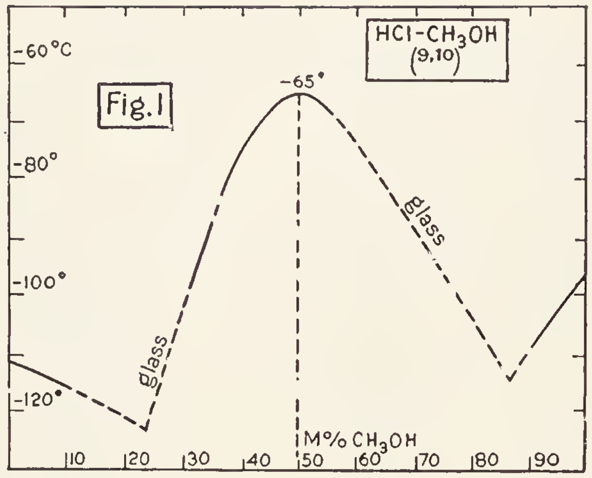
LITERATURE

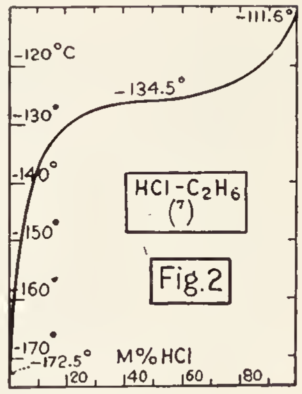
(For a key to the periodicals see end of volume)

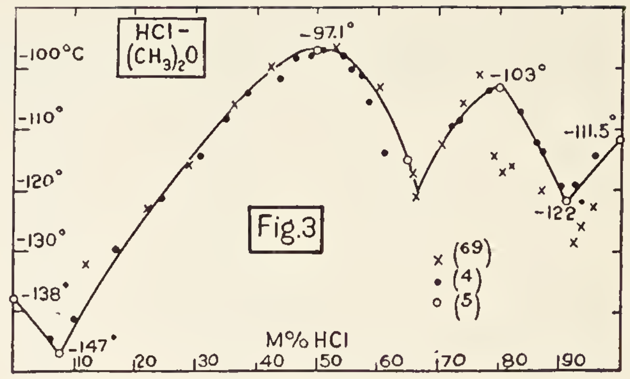
(1) Abe, *41*, **33**: 1087; 12. (2) Aten, *7*, **54**: 121; 06. (3) Atkins and Werner, *4*, **101**: 1167; 12. (4) Baume, *42*, **9**: 245; 11. (5) Baume, *42*, **12**: 216; 14. (6) Baume and Borowski, *42*, **12**: 276; 14. (7) Baume and Georgitses, *42*, **12**: 250; 14. (8) Baume and Germann, *42*, **12**: 242; 14. (9) Baume and Pamfil, *34*, **155**: 426; 12.

(10) Baume and Pamfil, *42*, **12**: 256; 14. (11) Baume and Perrot, *42*, **12**: 225; 14. (12) Baxter and Kobayashi, *1*, **39**: 249; 17. (13) Baxter and Rupert, *1*, **42**: 2046; 20. (14) Bellucci and Grassi, *36*, **44 I**: 559; 14. (16) Bertheaume, *34*, **150**: 1063; 10. (17) Bödtker, *7*, **22**: 505; 97. (18) Bokhorst, *Diss.*, Amsterdam, 1915. (19) Bond and Beach, *1*, **48**: 348; 26. (19.5) Bonnell and Jones, *4*, **129**: 318; 26.

(20) Bregmann, *Thesis*, Lausanne, 1914. (21) Breithaupt, *Thesis*, Geneva, **38**, No. 446. (22) de Bruyn, *7*, **10**: 782; 92. (23) Bunsen, *B50*, **II 1**: 232; 06. (24) Cambi, *22*, **21 I**: 773; 12. (25) Centnerszwer, *7*, **72**: 431; 10. (26)


HCl-CH3OH (9,10)
Fig.1
-65°
glass
glass
-60°C
-80°
-100°
-120°
M% CH3OH
10 20 30 40 50 60 70 80 90


-111.6°
-120°C
-134.5°
-130°
-140°
-150°
-160°
-170°
-172.5°
HCl-C2H6 (7)
Fig.2
M% HCl
20 40 60 80


HCl-(CH3)2O
-97.1°
-103°
-111.5°
-100°C
-110°
-120°
-130°
-138°
-147°
-122°
Fig.3
x (69)
• (4)
o (5)
M% HCl
10 20 30 40 50 60 70 80 90

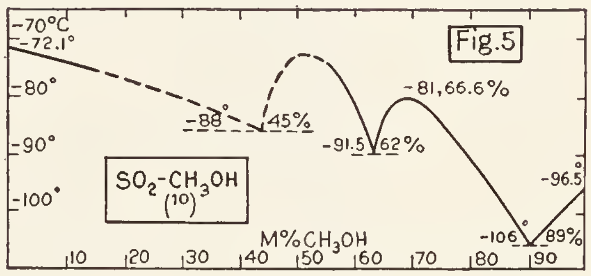
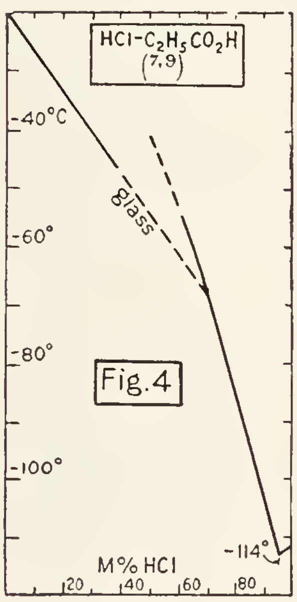
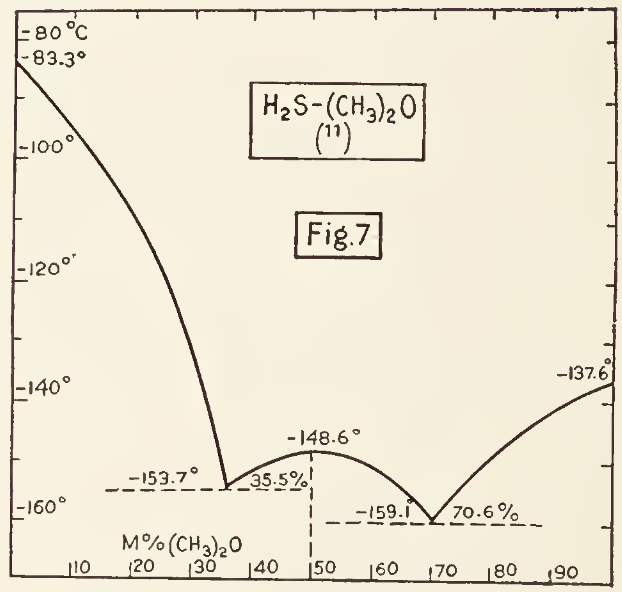
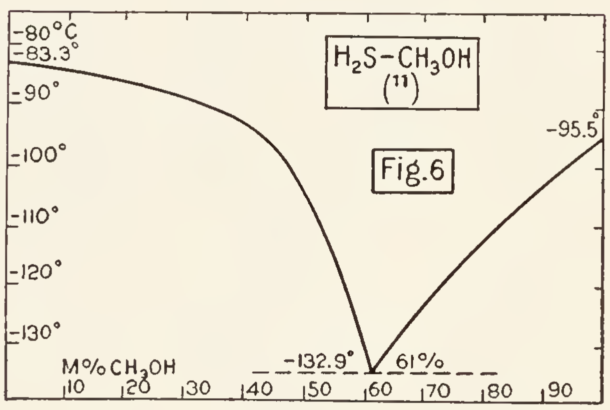
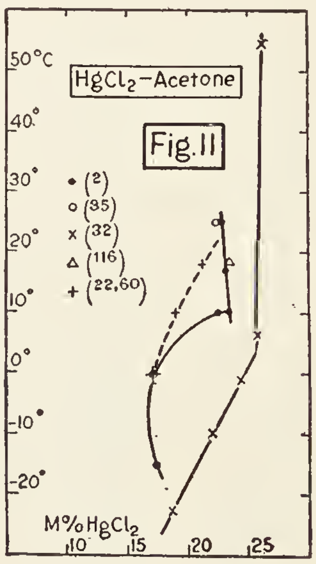


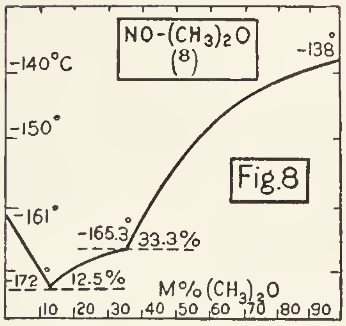
Fig.5
-70°C
-72.1°
-80°
-88°
45%
-81, 66.6%
-90°
-91.5
62%
-96.5°
-100°
SO2-CH3OH (10)
-106°
89%
M% CH3OH
10 20 30 40 50 60 70 80 90

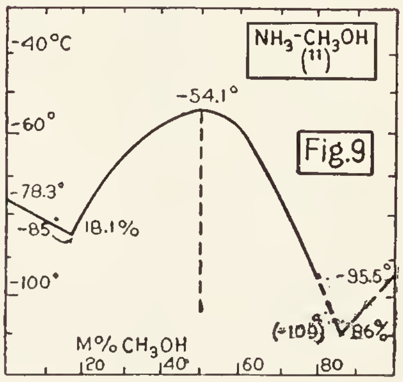

HCl-C2H5CO2H (7,9)
-40°C
glass
-60°
-80°
Fig.4
-100°
-114°
M% HCl
20 40 60 80

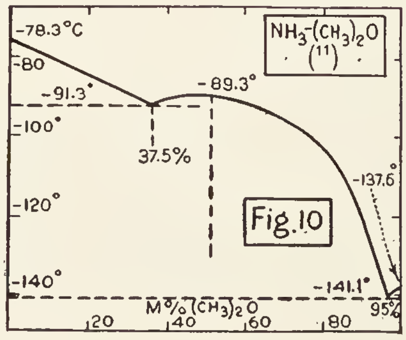

-80°C
-83.3°
H2S-(CH3)2O (11)
-100°
Fig.7
-120°
-140°
-137.6°
-148.6°
-153.7°
35.5%
-160°
-159.1°
70.6%
M% (CH3)2O
10 20 30 40 50 60 70 80 90

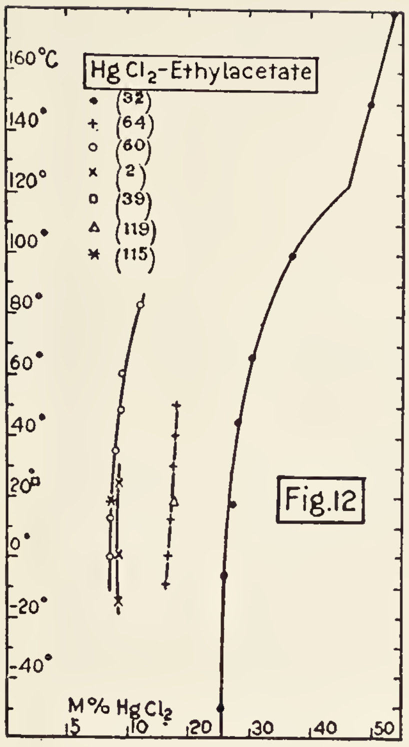

-80°C
-83.3°
H2S-CH3OH (11)
-90°
-95.5°
-100°
Fig.6
-110°
-120°
-130°
-132.9°
61%
M% CH3OH
10 20 30 40 50 60 70 80 90

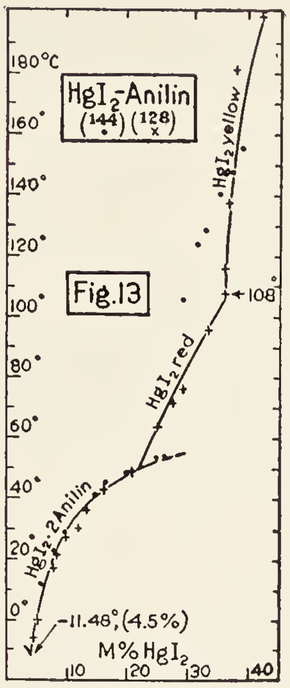

50°C
HgCl2-Acetone
40°
Fig.11
30°
• (2)
o (35)
x (32)
Δ (116)
+ (22,60)
20°
10°
0°
-10°
-20°
M% HgCl2
10 15 20 25


NO-(CH3)2O (8)
-138°
-140°C
-150°
Fig.8
-161°
-165.3°
33.3%
-172°
12.5%
M% (CH3)2O
10 20 30 40 50 60 70 80 90


-40°C
NH3-CH3OH (11)
-54.1°
-60°
Fig.9
-78.3°
-85°
18.1%
-95.5°
-100°
(-109)
86%
M% CH3OH
20 40 60 80


-78.3°C
NH3-(CH3)2O (11)
-80
-91.3°
-89.3°
-100°
37.5%
-137.6°
-120°
Fig.10
-140°
-141.1°
95%
M% (CH3)2O
20 40 60 80


HgCl2-Ethylacetate
(32)
(64)
(60)
(2)
(39)
(119)
(115)
Fig.12
M% HgCl2


HgI2-Anilin
(144) (128)
Fig.13
HgI2 yellow
HgI2 red
HgI2·2Anilin
108°
-11.48°,(4.5%)
M% HgI2

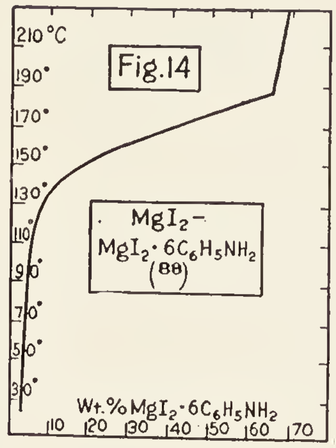
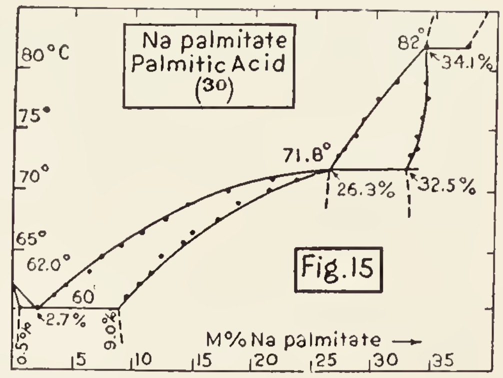
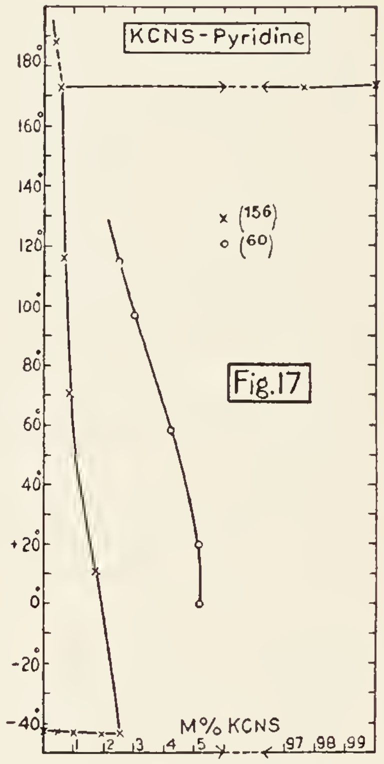
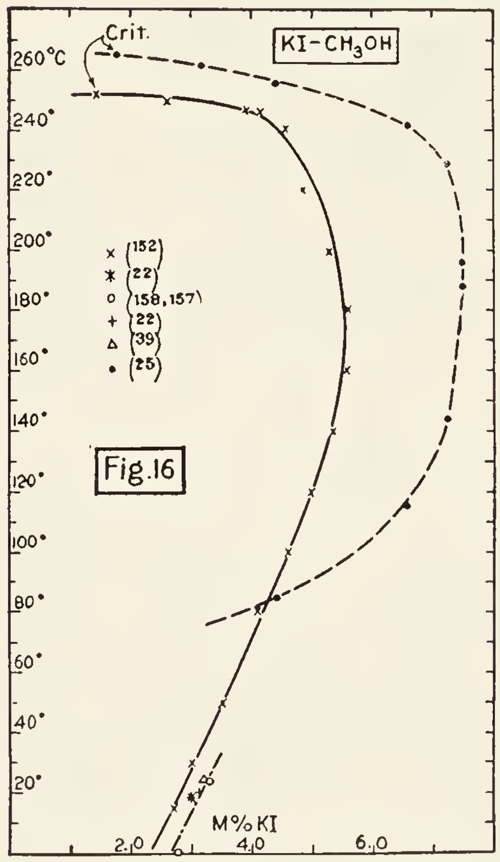
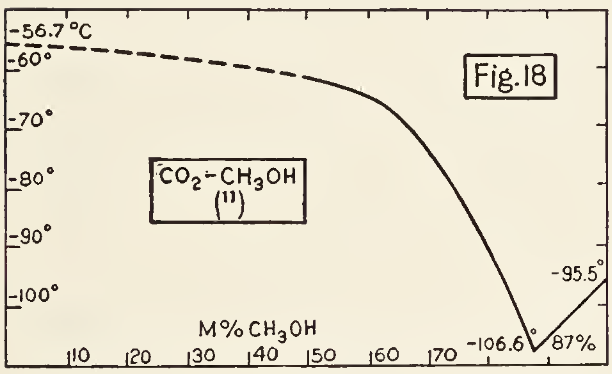


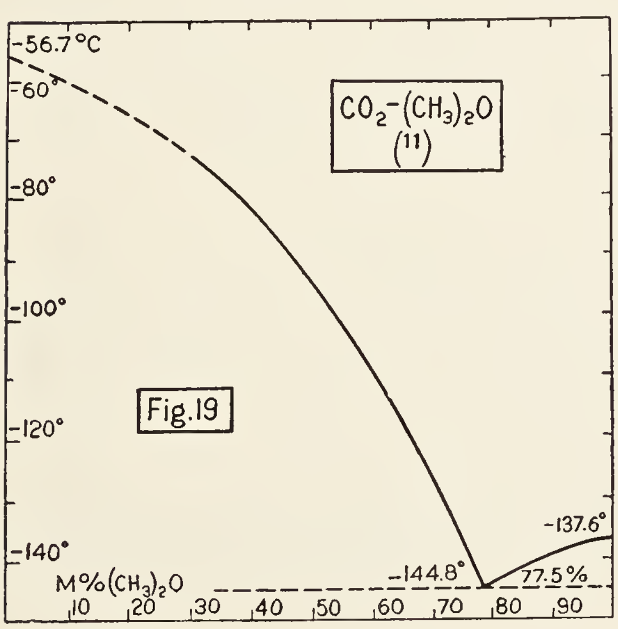
Fig.14
MgI2-
MgI2·6C6H5NH2
(88)
Wt.% MgI2·6C6H5NH2

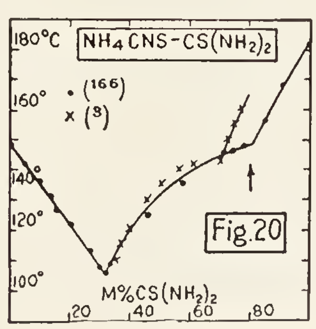

Na palmitate
Palmitic Acid
(30)
82°
34.1%
71.8°
26.3%
32.5%
62.0°
60
2.7%
9.0%
0.5%
Fig.15
M% Na palmitate


KCNS-Pyridine
(156)
(60)
Fig.17
M% KCNS


Crit.
KI-CH3OH
(152)
(22)
(158,157)
(22)
(39)
(25)
Fig.16
M% KI


-56.7 °C
Fig.18
CO2-CH3OH
(11)
-95.5°
M% CH3OH
-106.6°
87%


-56.7 °C
CO2-(CH3)2O
(11)
Fig.19
-137.6°
-144.8°
77.5%
M% (CH3)2O


NH4CNS-CS(NH2)2
(166)
(3)
Fig.20
M% CS(NH2)2

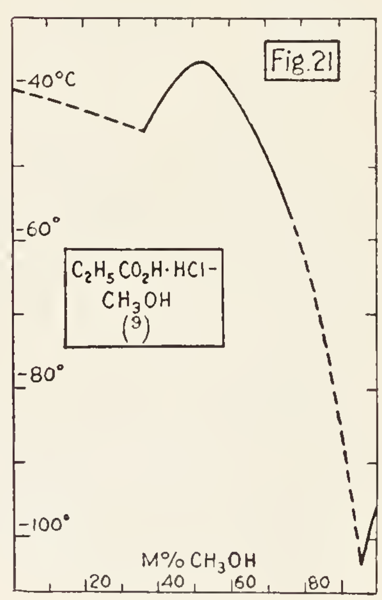


Fig.21
-40°C
C2H5CO2H·HCl-
CH3OH
(9)
M% CH3OH

Chauvenet, *34*, **158**: 128; 14. (27) Chugaev and Kulopin, *93*, **82**: 401; 12. (28) Cocheret, *Diss.*, Leiden, 1911. (29) D'Ans and Siegler, *7*, **82**: 35; 12.
(30) Donnan and White, *4*, **99**: 1668; 11. (30.5) Dunnicliff, Sikka and Hoon, *50*, **30**: 1211; 26. (31) Eder, *52*, **17**: 44; 78. (32) Étard, *6*, **2**: 503; 94. (33) Fisher, *53*, **46**: 1250; 14. (34) Foote, *1*, **32**: 618; 10. (35) Foote and Haigh, *1*, **33**: 459; 11. (36) Foote and Walden, *1*, **33**: 1032; 11. (37) Gott and Muir, *4*, **57**: 137; 90. (38) Heise, *50*, **16**: 373; 12. (39) Herz and Anders, *93*, **52**: 164; 07.
(40) Herz and Knoch, *93*, **41**: 315; 04. **45**: 262; 05. **46**: 193; 05. (41) Herz and Kuhn, *93*, **60**: 152; 08. (42) Hill, *1*, **43**: 254; 21. (43) Hill, *1*, **44**: 1163; 22. (44) Hill and Macy, *1*, **46**: 1132; 24. (44.5) Hill and Miller, *1*, **47**: 2703; 25. (45) Hofmann, Kirmreuther and Thal, *25*, **43**: 183; 10. (46) Holm, *184*, **94**: 138; 22. *Thesis*, Amsterdam, 1921. (47) Isbekow, *93*, **143**: 80; 25. (48) James, *4*, **103**: 1368; 12. (49) Jonescu, *Diss.*, Geneva, 1913.
(50) Kelech, *Thesis*, Zürich, 1912. (51) Kendall and Adler, *1*, **43**: 1470; 21. (52) Kendall and Carpenter, *1*, **36**: 2498; 14. (53) Kendall, Crittenden and Miller, *1*, **45**: 963; 23. (54) King and Partington, *4*, **129**: 20; 26. (55) Kolb, *93*, **83**: 143; 13. (56) Kraus and Greer, *1*, **45**: 3078; 23. (57) Krug and McElroy, *320*, **6**: 184; 92. (58) Kurnakov, *53*, **48**: 1672; 16. (59) Kurnakov, Perelmuter and Kanov, *169*, **24**: 399; 15. *10*, **4**: 205; 21.
(60) Laszczynskii, *25*, **27**: 2285; 94. (61) Laurie, *68*, **31**: 375; 12. (62) Lemoine, *34*, **125**: 603; 97. (63) Leopold, *7*, **71**: 59; 10. (64) Linebarger, *11*, **16**: 214; 94. (65) Linebarger, *12*, **49**: 48; 95. (66) Lloyd, *50*, **22**: 300; 18. (67) Maass, Boomer and Morrison, *1*, **45**: 1433; 23. (68) Maass and Hatcher, *1*, **44**: 2472; 22. (69) Maass and McIntosh, *1*, **34**: 1273; 12.
(70) Maass and McIntosh, *1*, **35**: 535; 13. (71) Maass and Russell, *1*, **40**: 1561; 18. (72) Maass and Russell, *1*, **43**: 1227; 21. (73) McBride, *50*, **14**: 189; 10. (74) McDermott, *1*, **33**: 1963; 11. (75) McIntosh, *1*, **33**: 71; 11. (76) McMaster and Pratte, *1*, **45**: 2999; 23. (77) Macy, *1*, **47**: 1032; 25. (78) Macy and Thomas, *1*, **48**: 1547; 26. (79) Mameli and Cocconi, *36*, **52 II**: 113; 22.
(80) Mason and Mathews, *50*, **29**: 1178; 25. (81) Mathews and Benger, *50*, **18**: 263; 14. (82) Mathews and Ritter, *50*, **21**: 269; 17. (83) Mathews and Spero, *50*, **21**: 402; 17. (84) Matignon, *172*, **2**: 53; 09. (85) Menshutkin, *93*, **49**: 34; 06. (86) *Idem*, **49**: 207; 06. (87) *Idem*, **52**: 9; 07. (88) *Idem*, **52**: 152; 07. (89) *Idem*, **53**: 26; 07.
(90) Menshutkin, *93*, **54**: 89; 07. (91) *Idem*, *53*, **41**: 1053; 09. (92) *Idem*, **41**: 1089; 09. (93) *Idem*, *93*, **61**: 100; 09. (94) *Idem*, **61**, 113; 09. (95) *Idem*, *42*, **9**: 314; 10. (96) *Idem*, *53*, **42**: 58; 10. (97) *Idem*, **42**: 1310; 10. (98) *Idem*, *179*, **13**: 1; 10. (99) *Idem*, **13**: 17; 10.
(100) Menshutkin, *53*, **43**: 393, 401, 425; 11. (101) *Idem*, **43**: 1303, 1329; 11. (102) *Idem*, *179*, **15**: 65; 11. *10*, **2**: 88; 13. (103) *Idem*, **15**: 95; 11. *10*, **2**: 89; 13. (104) *Idem*, **15**: 793; 11. *10*, **2**: 88; 13. (105) *Idem*, *179*, **16**: 83; 12. *10*, **2**: 94; 21. (106) *Idem*, *169*, **16**: 226; 12. *10*, **3**: 88; 14. (107) *Idem*, *179*, **16**: 397; 12. *10*, **3**: 88; 14. (108) *Idem*, *53*, **44**: 1079; 12. (109) *Idem*, **44**: 1102; 12.
(110) Menshutkin, *53*, **44**: 1108; 12. (111) *Idem*, **44**: 1113; 12. (112) *Idem*, **44**: 1128; 12. (113) Muchin, *9*, **18**: 757; 12. (114) Muchin, *Trav. soc. sc. phys. chim. Univ. Karkoff*, **39**: 24; 13. (115) Naumann, *25*, **37**: 3600; 04. (116) *Idem*, **37**: 4328; 04. (117) *Idem*, **37**: 3600, 4328; 04. (118) *Idem*, **42**: 3789; 09. (119) *Idem*, **43**: 313; 10.
(120) Naumann, *25*, **47**: 1369; 14. (121) *Idem*, **47**: 247; 14. (122) Neave, *173*, **37**: 399; 12. (123) Neustadt, *9*, **16**: 866; 10. (124) Normand, *4*, **107**: 285; 15. (125) Oechsner de Coninck, *34*, **130**: 1304; 00. **131**: 58, 1303; 00. **132**: 90; 01. *186*, **1902**: 94. (126) Pascal and Garnier, *34*, **176**: 450; 23. (127) Pascal and Normand, *27*, **13**: 878; 13. (128) Pearce and Fay, *50*, **18**: 667; 14. (129) Pearce and Moore, *11*, **50**: 218; 12.
(130) Peddle and Turner, *4*, **103**: 1202; 12. (130.5) Pernot, *34*, **182**: 1154; 26. (131) Pierrat, *34*, **172**: 1041; 21. (132) Piña de Rubies, *149*, **38**: 414; 14. (133) Pushin and Kriger, *53*, **46**: 560; 14. *10*, **4**: 205; 21. (134) Pushin and Löwy, *93*, **150**: 167; 26. (135) Rabinovitsch and Jakubsohn, *93*, **129**: 1; 23. (136) Roshdestwensky and Lewis, *4*, **99**: 2138; 11. (137) Roshdestwensky and Lewis, *4*, **101**: 2094; 12. (138) Salm and Prager, *136*, **42**: 463; 18. (139) Schroeder, *52*, **77**: 267; 08.
(140) Seidell, *B51*; 1919. (140.5) Seyer and Ball, *69*, **19 III**: 149; 25. (141) Seyer and Dunbar, *69*, **16 III**: 307; 22. (142) Smith, *1*, **45**: 2072; 23. (143) Smits and Bokhorst, *7*, **89**: 374; 15. (144) Staronka, *180*, **1910A**: 372. (145) Stock, *25*, **43**: 150; 10. (146) Strauli, *Diss.*, Zürich, 1918. (146.5) Stuckgold, *42*, **15**: 502; 17. (147) Sulc, *93*, **25**: 399; 00. (148) Thiel and Schulte, *7*, **96**: 312; 20. (149) Thin and Cumming, *4*, **107**: 361; 15.
(150) Timofeev, *34*, **112**: 1223; 91. (151) Turner and Bissett, *4*, **103**: 1904; 13. (152) Tyrer, *4*, **97**: 621; 10. (153) Tyrer, *182*, **27**: 142; 11. (154) Vanstone, *4*, **105**: 1491; 14. (155) Vaseliev, *Diss.*, Kajane. (156) Wagner and Zerner, *57*, **31**: 833; 10. (157) Walden, *7*, **55**: 683; 06. (158) Walden, *7*, **55**: 683; 06. (159) Walden, *9*, **27**: 34; 21.
(160) Walton and Judd, *1*, **33**: 1036; 11. (161) Walton and Wise, *1*, **44**: 103; 22. (162) Wartenberg, *13*, **440**: 97; 24. (163) Willard and Smith, *1*, **44**: 2816; 22. (164) Willard and Smith, *1*, **45**: 285; 23. (165) Wirth and Bakke, *93*, **87**: 13; 14. (166) Wretos, *Thesis*, Zürich, 1914. (167) Wuth, *25*, **35**: 2415; 02. (168) Beach and Bond, *453*, **32**: 328, 25. (169) Dorfman and Hildebrand, *1*, **49**: 729; 27.

Part IV. Cryoscopic Data

In the following tables are given, arranged by solvents, the following information, in the order stated:

(*a*) The solvent.

(*b*) Its freezing point.

(*c*) A "best" value (where determined) for the molal lowering, k_F $(= \Delta t/N)$ for a normal solute in dilute solution in the solvent, as deduced from the freezing-point data (N = moles of solute per 1000 g solvent).

(*d*) A list of the solutes which have been studied in the solvent, each solute, or the list of solutes, being followed (in parentheses) by the approximate upper limit of the concentrations (c) studied expressed in the units stated at the end of the list.

(*e*) The literature references.

From the value of k_F for a normal solute in dilute solution, the latent heat of fusion, l in g-cal per g of solvent may be calculated from the relation $l = \frac{1.99T_F^2}{1000k_F}$, where T_F is the absolute freezing point of the pure solvent. Most of the investigations reported below were for the purpose of determining molecular weights in solution, and for the authors' conclusions with respect to this subject, reference should be had to the original literature.

I. Inorganic Solvents

Standard arrangement by solvents

HBr: −91°C; k_F = 103.1—acetaldehyde, acetic acid, acetone, carbon tetrachloride, chloroform, ethyl acetate, ethyl alcohol, ethyl ether, methyl alcohol, paraldehyde, toluene (c up to *ca.* 2 to 4 g/100 g) (15).

I_2: k_F = 213—(SnI_4, SbI_3, AsI_3 in HgI_2); azobenzene, benzoic acid, benzoic anhydride, *p*-dibromobenzene, *p*-dinitrobenzene, diphenyl, *β*-iodopropionic acid, methyl iodide, naphthalene, phenanthraquinone, and the following substituted ammonium iodides: phenyl, tetramethyl, trimethyltolyl, trimethylphenyl (c up to *ca.* 1 to 7 Wt. % solute) (14).

(1) H_2SO_4 **(pure)**: k_F = 68.1. (2) H_2SO_4 with M. P. depressed 0.2°C by H_2O: In each solvent: acetic, benzoic, butyric, formic, fumaric, isophthalic, maleic, malonic, oxalic, *o*-phthalic, propionic, salicylic, succinic, mono-, di-, and trichloroacetic, *p*-toluic acids. In solvent (2): *o*-, *m*-, *p*-chlorobenzoic, chlorosuccinic, glutaric, methylsuccinic, *o*-nitrobenzoic, sebacic, suberic, and terephthalic acids; acetic, phthalic and succinic anhydrides; acetaldehyde, acetone, benzaldehyde, benzophenone, coumarin, cinnamic aldehyde, ethyl phenyl ketone, fluorenone, menthone, phthalide, valerolactone (c up to *ca.* 1 to 3 g/100 g) (10). (3) H_2SO_4 with M. P. depressed 0.1°C by H_2O: k_F = 69—trichloroacetic acid, trinitrobenzene, phthalic anhydride, picric acid; k_F = 91–73—dimethyl sulfate, oxalic acid, trinitrotoluene (11).

NH_3: $NaNO_3$, KI (24); acetanilide (0.0438–0.23289/17.1 g NH_3), mannitol (0.1206–0.2785g/17.1 g NH_3) (16).

$2H_3PO_4.H_2O$: 29°C; k_F = 52.6—acetic, butyric, formic, propionic and valeric acids; k_F = 68—acetone (4).

$POCl_3$: 1.25°C; k_F = 77.5—benzene, carbon tetrachloride, naphthalene, nitrobenzene (22); 0.4 to 0.9°C; k_F = 72.1—acetic anhydride, acetone, cyclohexanone, dipropyl ether, hexane; k_F = 78.2—benzene, indene, naphthalene, nitrobenzene, nitronaphthalene, toluene (12).

$SbCl_5$: k_F = 18.5—carbon tetrachloride, chloroform, hexachloroethane (8).

$TiBr_4$: 38.5°C; k_F = 226—benzene, bromoform, ethyl bromide, tetrabromoethane, tetrabromomethane (3).

$HgBr_2$: 236°C; k_F = 290–640—sulfur at concentration of 0.1254–7.870% (13); 236°C; k_F = 396—anthraquinone, phenanthraquinone (13).

HgI_2: 255°C; k_F = 540–550—anthraquinone, phenanthraquinone ([1]).

$Na_2SO_4.10H_2O$: k_F = 32.15 ([7]).

$Na_2S_2O_3.5H_2O$: 48.5°C; k_F = 42.6—urea ([7]).

II. Organic Solvents

(The C-Arrangement)

$CHBr_3$: diethylammonium chloride (3.5), diethylammonium iodide (3.1), dimethylpyrone (1.2), dipropylammonium chloride (3.2), isobutylammonium chloride (1.5), methylphenylammonium chloride (4.5), phenyldiethylammonium chloride (3.9), phenyldiethylammonium iodide (3.1), tetraisoamylammonium iodide (4.0), tribenzylammonium chloride (1.7), triethylammonium bromide (3.2), triethylammonium chloride (3.6), triethylammonium iodide (0.3) (*c* in g/100 g) ([19]); S_2Cl_2(2.8) g/100 g ([2]).

CH_2O_2, Formic acid: HCl (2.2), NH_4Cl (2.9), NH_4Br (3.9), LiCl (0.8), NaCl (4.6), NaBr (5.0), KCl (3.5), KBr (6.5) (*c* in g/100 g) ([25]); H_2SO_4 (3.2) ([9]); 8.4°C—diethylammonium chloride (58.0), tetraethylammonium iodide (37.4), tetrapropylammonium iodide (29.9), triethylammonium chloride (36.7), triethylammonium iodide (7.4) (*c* in mol/100 l) ([21]). *See also infra.*

$C_2H_3ClO_2$, Chloroacetic acid: H_2SO_4 (2.69), HNO_3 (5.40) (*c* in g/100 g) ([9]).

$C_2H_4Br_2$: HNO_3(2.23) g/100 g ([9]).

$C_2H_4O_2$, Acetic acid: 16.5°C—ammonium thiocyanate, ethylammonium chloride, tetraamylammonium iodide, tetraethylammonium bromide, tetramethylammonium thiocyanate, tetrapropylammonium iodide, triphenylamylammonium iodide (*c* up to *ca.* 2 to 3 mol/100 cc) ([23]); diethylammonium chloride (121.0), isobutylammonium chloride (64.2), phenylethylammonium chloride (41.2), tetraethylammonium bromide (42.2), tetraethylammonium chloride (111.3), tetrapropylammonium nitrate (23.7), tetrapropylammonium iodide (31.6), triethylammonium bromide (32.8), triethylammonium chloride (51.2), triethylammonium iodide (13.2) (*c* in mol/100 l) ([21]); 16.5°C—LiCl (2.5), NaBr (1.4) (*c* in mol/100 cc) ([25]); H_2SO_4 (1.6), HNO_3 (3.8) (*c* in g/100 g) ([9]).

$C_2H_4O_2$, Acetic acid (anhydrous): LiBr, LiI, $LiNO_3$, NaBr, $NaC_2H_3O_2$ ([24]).

$C_3H_7NO_2$, Urethane: diethylammonium chloride (86.2), isobutylammonium chloride (96.9), quinoline ethiodide (15.2), tetraethylammonium bromide (55.6), tetrapropylammonium iodide (24.2), tetrapropylammonium nitrate (49.3), triethylammonium chloride (59.9) (*c* in mol/100 l) ([21]).

$C_4H_8O_2$, Ethyl acetate: dimethyl sulfate (3.0) g/100 g ([9]).

$C_5H_{11}NO_2$, Ethylurethane: NH_4I (0.22), Li salicylate (0.24), KI (0.05), RbI (0.02) (*c* in mol /100 cc) ([18]).

$C_6H_5NO_2$, Nitrobenzene: H_2SO_4 (11.5), HNO_3 (6.7) (*c* in g/100 g) ([9]); 5.66°C—quinoline ethiodide (2.8), tetrapropylammonium iodide (4.4), tetrapropylammonium nitrate (6.2) (*c* in mol/100 l) ([21]).

C_6H_6, Benzene: dimethyl sulfate (4.2) g/100 g ([9]).

C_6H_6O, Phenol: diethylammonium chloride (43.6), isobutylammonium chloride (53.3), tetraethylammonium iodide (30.5), tetrapropylammonium iodide (29.1), tetrapropylammonium nitrate (28.3), triethylammonium bromide (35.4), triethylammonium chloride (42.8), triethylammonium iodide (29.0) (concentration in mol/100 l) ([21]); aniline hydrochloride (11.5), dimethylammonium chloride (9.3), tetramethylammonium iodide (11.9) (*c* in g/100 cc) ([5]); Na acetate (3.9), K oximidoketohydrindene (1.35), Rb oximidochloroketohydrindene (2.8) (*c* in g/100 cc) ([5]).

$C_6H_{12}O$, Cyclohexanol: $LiClO_4$(0. 000849–0.031701 mol/l), LiBr (0.00352–0.02011 mol/l) ([17]).

C_7H_9N, *p*-Toluidine: diethylammonium chloride (75.6), isobutylammonium chloride (87.7), quinoline ethiodide (29.0), phenylethylammonium chloride (47.1), tetraethylammonium bromide (37.6), tetraethylammonium chloride (59.8), tetraethylammonium iodide (28.7), tetrapropylammonium nitrate (39.6), tetrapropylammonium iodide (36.8), triethylammonium bromide (54.1), triethylammonium chloride (76.7) (*c* in mol/100 l) ([21]).

$C_{10}H_8$, Naphthalene: tetraamylammonium iodide (1.05) mol/100 l ([21]).

$C_{12}H_{11}N$, Diphenylamine: diethylammonium chloride (30.1), tetraethylammonium iodide (45.6), tetrapropylammonium iodide (24.4), tetrapropylammonium nitrate (25.8), triethylammonium bromide (35.1), triethylammonium chloride (56.7), triethylammonium iodide (33.2) (*c* in mol/100 l) ([21]); tetraethylammonium iodide (0.86) mol/100 cc ([23]).

Solutions with Two or More Solutes

$CHBr_3$: Chlorobenzene + triethylammonium bromide, bromine + triethylammonium chloride, diethylammonium nitrate + iodine, dipropylammonium chloride + triethylammonium chloride, dipropylammonium chloride + tetraisoamylammonium iodide, dipropylammonium chloride + triethylammonium chloride, isobutylammonium chloride + triethylammonium bromide, isobutylammonium chloride + triethylammonium chloride, ethyl iodide + triethylammonium bromide, ethyl iodide + triethylammonium chloride, iodine + phenol, iodine + tetraisoamylammonium chloride, iodine + triethylammonium chloride, iodine + triethylammonium bromide, iodobenzene + triethylammonium bromide ([20]); S_2Cl_2 + S_8 ([2]); diethylammonium chloride + tetrapropylammonium iodide, phenyldiethylammonium chloride + phenyldiethylammonium iodide ([20]).

C_6H_6: iodine + benzoyl iodide, iodine + chlorobenzene, iodine + ethyl iodide, iodine + propyl chloride ([20]); ethyl alcohol + CdI_2, ethyl alcohol + $HgCl_2$, methyl alcohol + CdI_2, methyl alcohol + $HgCl_2$, propyl alcohol + CdI_2 ([1]).

A = solute = salts of formic acid. B = solvent = formic acid ([6]).

Solute	Observed Δt for 5 Mol % B,* °C	Compounds
$HCOONH_4$	5.9	AB_3; AB
HCOOK	6.6	AB_3; AB_2; AB
HCOONa	5.9	AB_2; AB
HCOOLi	4.9	
$(HCOO)_2Ba$	8.5	AB
	3.3	

* Calculated.

LITERATURE

(For a key to the periodicals see end of volume)

([1]) Beckmann, *93*, **89**: 167; 14. ([2]) Bruni and Amadori, *36*, **50**: 97; 20. ([3]) Falciola, *73*, **2**: 221; 10. ([4]) Falciola, *73*, **2**: 266; 10. ([5]) Hartung, *7*, **77**: 82; 11. ([6]) Kendall, Adler and Davidson, *1*, **43**: 1846; 21. ([7]) Leenhardt and Boutaric, *27*, **13**: 147, 651; 13. ([8]) Moles, *7*, **90**: 70; 15. ([9]) Oddo and Anelli, *36*, **41 I**: 552; 11.
([10]) Oddo and Casalino, *36*, **47 II**: 200; 17. ([11]) Oddo and Casalino, *36*, **48 I**: 17; 18. ([12]) Oddo and Mannessier, *36*, **41 II**: 212; 11. *93*, **73**: 259; 12. ([13]) Olivari, *22*, **21 I**: 718; 12. ([14]) Olivari, *22*, **22 II**: 697; 13. *22*, **23 I**: 41: 14. ([15]) Reid and McIntosh, *1*, **38**: 615; 16. ([16]) Schmid and Becker, 25, **58 B**: 1968; 25. ([17]) Schreiner and Frivold, *7*, **124**: 1; 26. ([18]) Stuckgold, *42*, **15**: 502; 17. ([19]) Turner, *4*, **101**: 1923; 12.
([20]) Turner and English, *4*, **105**: 1786; 14. ([21]) Turner and Pollard, *4*, **105**, 1751; 14. ([22]) Walden, *93*, **68**: 307; 10. ([23]) Walden, *9*, **26**: 60; 20. ([24]) Webb, *1*, **48**: 2263; 26. ([25]) Zanninovich-Tessarin. *7*, **19**: 251; 96.

SOLUBILITY OF SALTS AND OF STRONG ACIDS AND BASES IN WATER*

J. N. Brönsted

Abbreviations and Symbols; *v. also* p. 4

S = Anhydrous substance.

M = Gram-formula-weight (corresponding to formula given in the heading) per 1000 g H_2O.

x = Mole fraction $= \frac{M}{M + 55.51}$.

Abréviations et Symboles; *v. aussi*, p. 4

S = Substance anhydre.

M = Poids moléculaire de la formule en grammes pour 1000 g H_2O.

x = Fraction moléculaire $= \frac{M}{M + 55,51}$.

Abkürzungen und Symbole; *siehe auch* S. 4

S = Wasserlos Substanz.

M = Grammformelgewicht auf 1000 g H_2O.

x = Molenbruch $= \frac{M}{M + 55,51}$.

Abbreviazioni e Simboli; *v. anche* p. 4

S = Sostanza anidra.

M = Peso della formula espresso in grammi in 1000 g di H_2O.

x = Frazione di gr. molecola $= \frac{M}{M + 55,51}$.

𝔅-TABLE, STANDARD ARRANGEMENT (*v.* Vol. III, p. viii)

HCl [14, 15, 394, 438]

t, °C	M ± 3%
S · 3Aq	
−70	10.34
−60	11.02
−50	12.00
−40	13.38
−30	15.64
−24.9	18.50
S · 3Aq + S · 2Aq	
−27.4E	21.22
S · 2Aq	
−25	21.94
−20	24.16
−17.7	27.75
−20	33.64
S · 2Aq + S · Aq	
−23E	37.16
S · Aq	
−22	38.1
−20	40.5
−18	43.9
−16	49.3
−15.3	55.5

$HClO_4$ [531] (*See* Fig. 1)

t, °C	x
S · Aq	
−40	0.940
−20	0.899
0	0.843
+20	0.760
40	0.640
50	0.500
40	0.431
+20	0.398
0	0.379
−20	0.368
S · 2Aq	
−22	0.361
−20	0.353
−17.8	0.333
−20	0.313
−25	0.297
−30	0.287
−35m	0.280
−40m	0.273
−45m	0.268
S · 2.5Aq	
−29.8	0.286
−30	0.275
−32	0.261
−36	0.252
−40m	0.246
−44m	0.242
S · 3Aq(β)	
−47m	0.267
−46m	0.265
−45m	0.262
−44m	0.258
−43.2m	0.250
−44m	0.240
−45m	0.234
−46m	0.230
−47m	0.227
−48m	0.224
S · 3Aq(α)	
−41m	0.223
−40m	0.226
−39m	0.230
−38m	0.236
−37	0.250
−38m	0.265
−39m	0.272
−40m	0.277
−41m	0.281
S · 3.5Aq	
−45m	0.239
−44m	0.238
−43m	0.235
−42m	0.230
−41.4m	0.222
−42m	0.212
−44m	0.202
−46m	0.198
−48m	0.194
−50m	0.191
−52m	0.189

$HClO_4$.—(*Continued*)

t, °C	x Crys.	x Liq.
Mix₁†		
−44m		0.246
−42m		0.243
−40m		0.241
−38m	0.229	0.238
−36	0.224	0.233
−34	0.218	0.218
−36	0.203	0.194
−38	0.199	0.188
−40	0.196	0.185
−42	0.194	0.182
−44	0.191	0.180
−46		0.178
Mix₂†		
−52m	0.174	0.187
−50m	0.172	0.183
−48m	0.169	0.179
−46	0.166	0.174
−44	0.163	0.170
−42	0.160	0.164
−41	0.156	0.156
−42	0.151	0.147
−44	0.146	0.138
−46	0.142	0.133
−48	0.139	0.128
−50	0.136	0.124
−52	0.134	0.120
−54	0.131	0.117
−56	0.129	0.144

t, °C	x
Mix₁ + Mix₂	
−47.2E	0.177

* Except (*a*) solubilities of slightly soluble electrolytes, for which consult the final index under "Electrical conductivity;" (*b*) systems composed of two liquid phases, for which *v.* Vol. III, p. 386; and (*c*) solubility of complex metal-ammonia salts in water, for which the following original literature should be consulted. In most instances, the data given are for only one or two temperatures [66, 67, 68, 69, 83, 85, 116, 141, 142, 257, 284, 289, 349, 404, 520, 521].

* Excepté: (*a*) Solubilités des électrolytes peu solubles, pour lesquelles on consultera l'index final sous "Conductibilité électrique," (*b*) systèmes composés de deux phases liquides, pour lesquels *v.* Vol. III, p. 386 et (*c*) solubilité dans l'eau des sels complexes des métaux avec l'ammoniaque, pour laquelle on consultera les sources bibliographiques originales suivantes. Dans la plupart des cas l'information n'est donnée que pour une ou deux températures seulement [66, 67, 68, 69, 83, 85, 116, 141, 142, 257, 284, 289, 349, 404, 520, 521].

* Ausgenommen: (*a*) Wenig lösliche Elektrolyte, für welche im Schluss-Index unter "Elektrische Leitfähigkeit" nachzusehen ist; (*b*) Systeme mit zwei flüssigen Phasen, *siehe* Bd. III, S. 386; (*c*) Löslichkeit komplexer Metallammoniaksalze in Wasser, für welche die folgende original Literatur heranzuziehen ist. In den meisten Fällen beziehen sich die Angaben nur auf ein oder zwei Temperaturen [66, 67, 68, 69, 83, 85, 116, 141, 142, 257, 284, 289, 349, 404, 520, 521].

* Sono eccettuati: (*a*) Gli elettroliti poco solubili, per i quali si consulta l'indice finale al capitolo "Conducibilità elettrica;" (*b*) i sistemi con due fasi liquide, per i quali *vedi* Vol. III, p: 386; (*c*) le solubilità dei complessi metalloammonici nell' acqua, per i quali si consulti la letteratura originale indicata qui di seguito. Nella maggiore parte dei casi i dati si riferiscono solo a una o due temperature [66, 67, 68, 69, 83, 85, 116, 141, 142, 257, 284, 289, 349, 404, 520, 521].

$HClO_4$.—(*Continued*)

t, °C	*x*
Mix_1 + S · 3Aq(α)	
−37.8E	0.237
Mix_1 + S · 2.5Aq	
−42.3mE	0.244
S · 3.5Aq + S · 3Aq(β)	
−44.3mE	0.238
S · 3Aq(α) + S · 2.5Aq	
−37EU	0.250
S · 3Aq(α) + S · 2Aq	
−39.4mE	0.274
S · 3Aq(β) + S · 2.5Aq	
−43.7mE	0.242
S · 3Aq(β) + S · 2Aq	
−46.5mE	0.266
S · 2.5Aq + S · 2Aq	
−29.8E	0.288
S · 2Aq + S · Aq	
−23.5E	0.365
S	
−112	1.00

† Mixed crystals with compn. given in *x* scale.

HBr (15)

t, °C	M
S · 2Aq	
−24	22.0
−20	23.1
−16	24.3
−12	26.4
−11.3	27.8
−12	30.0
−14	32.6
S · 2Aq + S · Aq	
−15.5E	34.0
S · Aq	
−12	35.4
− 8	37.8
− 4	43.8

HI (395)

t, °C	M
S · 4Aq	
−70	8.56
−60	9.20
−50	10.20
−40	11.70
−36.0	13.88
−40	15.66
−45	16.64
S · 4Aq + S · 3Aq	
−48.5E	17.20
S · 3Aq	
−48.1	18.50
−50	20.28
S · 3Aq + S · 2Aq	
−55E	21.4
S · 2Aq	
−50	23.1
−45	24.7

HIO_3 (197, 316)

t, °C	M ± 3%
HIO_3	
−14	15.2
0	16.3
+20	18.0

HIO_3.—(*Continued*)

t, °C	M ± 3%
HIO_3	
40	20.1
60	22.8
80	26.5
100	32.5
HIO_3 + HI_3O_8	
110U	36.3
HI_3O_8	
120	37.6
140	42.7
160	53.9

H_2SO_3 (13)

t, °C	M
S · 6Aq	
0	1.87
2	2.17
4	2.55
6	3.12
8	4.00
10	5.24
12.1	7.93

H_2SO_4 (61, 129, 185, 258, 309, 389, 390, 391, 492)

t, °C	*x*
S · 4Aq	
−70	0.102
−50	0.129
−30	0.175
−25	0.194
−24.5	0.200
−30	0.225
−35	0.241
−45	0.269
S · 4Aq + S · 2Aq	
−50E	0.281
S · 2Aq	
−45	0.288
−40	0.310
−38.9	0.333
−40	0.350
S · 2Aq + S · Aq	
−41E	0.355
S . Aq	
−40	0.355
−20	0.370
−10	0.390
0	0.423
+ 5	0.450
8.5	0.500
5	0.553
0	0.588
−10	0.636
−20	0.672
−30	0.703
S · Aq + S	
−38E	0.723
S	
−35	0.732
−25	0.770
−15	0.815
− 5	0.870
0	0.905
+ 5	0.944
10.4	1.000

H_2SeO_4 (270)

t, °C	*x*
S · 4Aq	
−60	0.145
−55	0.161
−52	0.200
−55	0.250
S · 4Aq + S · Aq	
−57.2E	0.270
S · Aq	
−50	0.276
−40	0.286
−20	0.311
0	0.346
+20	0.410
25	0.453
26	0.500
25	0.520
20	0.560
S · Aq + S	
14.7E	0.590
S	
20	0.600
30	0.631
40	0.693
50	0.810
60	1.000

H_2TeO_4 (354)

t, °C	M ± 2%
S · 6Aq	
0	0.84
5	1.19
10	1.75
15m	2.52
S · 6Aq + S · 2Aq	
10.5U	1.82
S · 2Aq	
10m	1.80
20	2.16
30	2.53
40	2.95
60	3.92
80	5.51
100	8.06

NH_3 (136, 439)

v. also p. 251

t, °C	*x*
S	
−77.8	1.000
−80	0.964
−84	0.904
−88	0.857
−92	0.820
S + S · 0.5Aq	
−93.4E	0.809
S · 0.5Aq	
−92	0.803
−88	0.782
−84	0.754
−80	0.706
−78.8	0.667
−80	0.636
−82	0.616
−86	0.588
S · 0.5Aq + S · Aq	
−88E	0.576

NH_3.—(*Continued*)

t, °C	*x*
S · Aq	
−86	0.566
−82	0.544
−80	0.524
−79.3	0.500
−80	0.477
−90	0.400
−95	0.375

HNO_3 (280, 392)

t, °C	*x*
S · 3Aq	
−45	0.123
−35	0.143
−25	0.177
−20	0.209
−18.3	0.250
−20	0.289
−25	0.327
−30	0.354
−40	0.396
S · 3Aq + S · Aq	
−42.2E	0.404
S · Aq	
−40	0.428
−38	0.464
−37.3	0.500
−38	0.537
−40	0.570
−50	0.648
−60	0.693
S · Aq + S	
−67.3E	0.720
S	
−60	0.760
−50	0.839
−41.3	1.000

NH_4NO_3 (99, 106, 151, 200, 202, 331, 348, 351, 426, 455, 513)

t, °C	*x* ± 2%
S(α)	
−20	0.130
−10	0.174
0	0.218
+10	0.262
20	0.305
30	0.349
S(α) + S(β)	
32.3U	0.358
S(β)	
40	0.392
60	0.484
80	0.590
S(β) + S(γ)	
84U	0.613
S(γ)	
90	0.646
100	0.700
S(γ) + S(δ)	
125U	0.832
S(δ)	
140	0.895
160	0.968
169	1.000

$N_2H_4.HNO_3$ (471) Basic hydrazine nitrate

t, °C	x
S	
10	0.250
20	0.335
25	0.383
30	0.433
40	0.538
50	0.663
60	0.796

$NH_4NO_3.2HNO_3$ (196)

S	
−10	0.38
− 5	0.41
0	0.45
+ 5	0.49
10	0.54
15	0.62
20	0.70
25	0.82
29.5	1.00

NH_4Cl (3, 8, 20, 40, 84, 106, 139, 149, 199, 202, 315, 317, 327, 334, 338, 339, 363, 424, 426, 441, 443*, 447, 450, 451, 454, 500, 501)

t, °C	M ± 1%
S + Ice	
−15.4	4.58
S	
−15	4.60
0	5.55
+10	6.22
15	6.58
20	6.97
25	7.38
30	7.78
70	11.20
80	12.15
90	13.2
100	14.2

* Gives the equation, $-\log x = 464.5/T - 0.5400$ from 163 to 184.5°; and $-\log x = 327.8/T - 0.2412$ from 184.5 to 205°, U at 184.5°.

NH_4ClO_4 (80, 493)

t, °C	M ± 5%
S	
0	1.10
20	1.99
40	3.12
60	4.38
80	5.77
100	7.41
110	8.35

NH_4Br (135, 200, 468)

t, °C	M ± 2%
S(α)	
−20	4.61
0	6.10
+20	7.71
40	9.38
60	11.01
80	12.87

NH_4Br.—(*Continued*)

t, °C	M ± 2%
S(α)	
100	14.90
120	17.11
S(α) + S(β)	
137.3U	19.44
S(β)	
140	19.67
150	20.66
160	21.78
165	22.38

NH_4I (118, 200, 469)

S	
−27.4	9.24
0	10.51
+20	11.73
40	13.06
100	17.37
140	20.62

NH_4IO_3 (316)

t, °C	M
S	
30	0.227

NH_4IO_4 (23)

16	0.129

$N_2H_4.H_2SO_4$ (472) Hydrazine sulfate

S	
20	0.210
25	0.254
30	0.305
50	0.546
60	0.704
70	0.882
80	1.105

$(NH_4)_2SO_4$ (46, 58, 81, 345, 424, 426, 447, 451, 452, 453, 472, 513, 522)

t, °C	M ± 1%
S	
−20	5.01
0	5.35
+10	5.53
20	5.73
25	5.82
30	5.91
40	6.15
70	6.94
80	7.24
100	7.82

$(NH_4)_2S_2O_6$ (11)

t, °C	M
S · 0.5Aq	
0	6.80
20	8.47
30	9.31

$(N_2H_4)_2.H_2SO_4$ (472) Basic hydrazine sulfate

S · Aq	
25	12.5
35	15.3
45	22.6
S · Aq + S	
47.3U	27.6

$(N_2H_4)_2.H_2SO_4$.—(*Continued*)

t, °C	M
S	
50	28.7
55	31.0
60	34.2

H_3PO_4 (184, 470)

t, °C	x
S · 0.5Aq	
−20	0.373
−10	0.386
0	0.403
+10	0.431
20	0.484
25	0.534
27	0.594
29.35	0.667
27	0.704
25	0.750
S · 0.5Aq + S · 0.1Aq	
23.7E	0.766
S · 0.1Aq	
24	0.767
25	0.779
26	0.801
S · 0.1Aq + S	
26.3U	0.812
S	
27	0.814
30	0.824
35	0.862
40	0.935
42.3	1.0
S · 0.5Aq (435)	
−80	0.242
−60	0.270
−40	0.305
S · 0.5Aq + S	
23.5E	0.766
S	
23.5	0.766
25	0.777
30	0.825
35	0.885
40	0.962
42.35	1.000
No S · 0.1Aq	

$H_4P_2O_7$ (184)

t, °C	M
S · 1.5Aq	
26	0.400

$H_4P_2O_7$.—(*Continued*)

t, °C	M
S	
61	1.00

$NH_4H_2PO_4$ (71, 111)

t, °C	M ± 5%
S	
0	1.94
20	3.26
40	4.86
60	7.12
80	10.4
100	14.6

$(NH_4)_2HPO_4$ (71, 111)

t, °C	M ± 10%
S	
0	3.3
20	4.5
70	7.1

$(NH_4)_3PO_4$ (111)

t, °C	M
S · 3Aq	
25	1.19

SbF_3 (430)

S	
0	21.5
20	25.2
25	27.6
30	31.6

$SbCl_3$ (32, 120)

t, °C	x
S	
0	0.327
10	0.367
20	0.412
30	0.463
40	0.525
50	0.620
60	0.746
70	0.945
72	1.00

$(NH_4)_3SbS_4$ (127)

t, °C	M
S · 4Aq	
−13.4	2.33
0	2.34
+10	2.50
20	2.94
30	3.93

NOTE.—The following list of carbon compounds includes only salts. For organic acids and bases, *v.* p. 250.

NH_4HCO_2 (195); Formate

t, °C	M
S	
0	16.3
20	22.7
40	32.5
60	48.4
80	86.8
100	222.0
116	∞

NH_4HCO_3 (122, 149, 151, 490, 500, 501)

t, °C	M ± 5%
S	
0	1.50
10	2.02
20	2.66
30	3.42
40	4.30

$NH_4HCO_2.H_2CO_2$ (195)
Formate

t, °C	M
S	
−5	40.9
0	51.0
+5	67.3
10	93.7

$(NH_4)_2CO_3$ (338, 339)

S	
0	5.8(?)
15	6.5(?)

$(NH_4)_2C_2O_4$ (102, 138, 165); *cf.* (539)
Oxalate

t, °C	M ± 3%
S · Aq	
0	0.179
10	0.252
20	0.360
30	0.495
50	0.832

$(NH_4)_2C_4H_4O_8$ (152)
Dihydroxytartrate

t, °C	M
0	0.135

$C_5H_{11}NO_2.HCl$ (479)
Betaine hydrochloride

S	
0	2.86
20	3.96
40	5.32
80	8.48

Perchlorates of Organic Bases (238)
t = 15°

	M
$CH_3NH_3ClO_4$	8.4
$(CH_3)_2NH_2ClO_4$	14.3
$C_2H_5NH_3ClO_4$	14.3
$(CH_3)_3NHClO_4$	1.20
$(CH_3)_3(CH_2I)NClO_4$	0.105
$(C_2H_5)_2NH_2ClO_4$	8.7
$(CH_3)_4NClO_4$	0.030
$(CH_3)_3C_2H_5NClO_4$	0.58
$(CH_3)_3C_3H_7NClO_4$	0.77
$(CH_3)_2(C_2H_5)_2NClO_4$	6.7
$(CH_3)_3C_4H_9NClO_4$	0.171
$CH_3(C_2H_5)_3NClO_4$	1.09
$(C_2H_5)_4NClO_4$	0.163
$(CH_3)_3C_5H_{11}NClO_4$	0.098
$(CH_3)_3C_6H_5NClO_4$	0.75
$(C_2H_5)_3C_3H_7NClO_4$	0.32

$C_5H_{11}NO_2.HBr$ (479)
Betaine hydrobromide

t, °C	M
S	
0	2.00
20	3.20
40	4.62
100	9.84

$(CH_3)_4NI$ (228, 515)
Tetramethylammonium iodide

S	
0	0.100
25	0.275

$(C_2H_5)_4NI$ (515)
Tetraethylammonium iodide

t, °C	M
S	
0	0.714
25	1.783

$C_5H_{11}NO_2.HI$ (479)
Betaine hydroiodide

S	
0	2.80
20	5.60
40	8.36
80	13.86

$(C_5H_{11}NO_2)_2.HI$ (479)
Betaine hydroiodide, basic

S	
0	0.57
20	1.10
40	1.96
60	3.02
90	4.93

NH_4CNS (437)

S	
0	16.0
20	21.3

$C_5H_{11}NO_2.H_2SO_4$ (479)
Betaine sulfate

S.Aq.	
0	3.42
20	5.14
40	7.66
70	12.24

Isomeric Naphthylamine-disulfonates (154)
A = $C_{10}H_5NH_2(SO_3)_2$
t = 20°

2, 5, 7-isomers

	M
$(NH_4)_2A \cdot 3Aq$	6.32
$PbA \cdot 6Aq$	1.82
$ZnA \cdot 8Aq$	1.77
$CoA \cdot 8Aq$	1.16
$NiA \cdot 6Aq$	1.53
$MgA \cdot 8Aq$	0.82
$CaA \cdot 4Aq$	1.97
$SrA \cdot 4Aq$	1.08
$BaA \cdot 3Aq$	0.67
$NaHA \cdot 4Aq$	0.264
$Na_2A \cdot 6Aq$	7.49
$KHA \cdot 4Aq$	0.078
$K_2A \cdot 2Aq$	4.67

2, 6, 8-isomers

	M
$(NH_4)_2A \cdot 2Aq$	7.03
$PbA \cdot Aq$	1.58
$ZnA \cdot 8Aq$	1.44
$CoA \cdot 8Aq$	1.08
$NiA \cdot 6Aq$	1.38
$MgA \cdot 8Aq$	0.292
$CaA \cdot 3Aq$	1.20
$SrA \cdot 3Aq$	0.675
$BaA \cdot 3Aq$	0.311
$NaHA \cdot 4Aq$	0.248
$Na_2A \cdot 3Aq$	4.16
$KHA \cdot 2Aq$	0.074
$K_2A \cdot 2Aq$	2.78

$C_{12}H_{12}N_2.H_2SO_4$ (42)
Benzidine sulfate

t, °C	M ± 5%
0	0.00017
20	0.00028
40	0.00046
60	0.00067
80	0.00091

$C_{21}H_{22}O_2N_2.C_3H_6O_5S$ (170)
Strychnine sulfopropionate

t, °C	M
d-salt	
25	0.131
l-salt	
25	0.784

$(C_{19}H_{22}N_2O)_2.H_2SO_4$ (401)
Cinchonidine sulfate

t, °C	x
S · 6Aq(?)	
75	0.0015
90	0.0032
100	0.0128
110	0.0320
120	0.0442
130	0.0563
140	0.071
150	0.101
153	0.143
S · 6Aq + S · 2Aq	
153U	0.138
S · 2Aq	
155	0.145
165	0.184
170	0.21
S	
242	1.000

$(C_{20}H_{24}N_2O_2)_2.H_2SO_4$ (401)
Quinine sulfate

S · 7Aq(?)	
80	0.0004
100	0.0010
120	0.0023
130	0.0122
135	0.0252
140	0.0354
150	0.0480
155	0.075
S · 7Aq + S · 2Aq	
156.2U	0.0962
S · 2Aq	
160	0.104
170	0.152
175	0.24
176.5	0.333
S	
235.2	1.000

$NH_4C_7H_5ClNO_5S$ (113)
Chloronitrotoluene-*m*-sulfonate

t, °C	M
0	0.035
10	0.048
20	0.069
30	0.096

$C\,H_{11}NO_2.H_3PO_4$ (479)
Betaine phosphate

t, °C	M
S	
0	2.14
20	3.22
40	5.22
80	10.24

$(NH_4)_2ZrF_6$ (227)

t, °C	M*
0	0.612
20	1.054
45	1.84
90	2.96

* Per l soln.

$(NH_4)_3ZrF_7$ (227)

0	0.361
20	0.551
45	0.787

$SnCl_2$ (140, 173)

t, °C	M
S · 2Aq	
0	4.4
25	12.2

SnI_2 (532)

S (?)	
20	0.0265
30	0.0316
40	0.0386
50	0.0472
60	0.0568
70	0.0672
80	0.0785
90	0.0912
100	0.116

$PbCl_2$ (60, 62, 137, 206, 229, 295, 365)

t, °C	M ± 2%
S	
0	0.0242
10	0.0297
20	0.0357
25	0.0390
30	0.0427
40	0.0505
60	0.0697
80	0.0932
100	0.1199

$Pb(ClO_2)_2$ (290)

t, °C	M ± 10%
S	
0	0.0010
20	0.0028
40	0.0048
60	0.0072
80	0.0097
100	0.0123

$Pb(ClO_3)_2$ (357)

t, °C	M
S	
18	4.04

PbFCl (475)

t, °C	M ± 3%
S	
0	0.00080
20	0.00128
40	0.00191
100	0.00413

$PbBr_2$ (137, 295)

t, °C	M ± 2%
S	
0	0.0124
10	0.0167
20	0.0230
30	0.0313
40	0.0412
60	0.0642
80	0.0913
100	0.1294

PbI_2 (118, 137, 150, 292, 295)

t, °C	M ± 3%
S	
0	0.00092
10	0.00110
20	0.00139
30	0.00190
40	0.00261
60	0.00441
80	0.00670
100	0.00927

$Pb(IO_3)_2$ (211)

t, °C	M ± 0.5%
S	
25	0.0000553

PbN_6 (529)

t, °C	M
S	
18	0.00080
70	0.00315

$Pb(NO_3)_2$ (106, 145, 147, 148, 150, 186, 275, 327, 414, 447)

t, °C	M ± 2%
S	
0	1.217
10	1.43
20	1.66
25	1.80
30	1.94
100	3.79

No change was found in M when Pb of at. wt. 206.4 – 207.2 was present (147, 414).

$PbC_4H_4O_5$ (132)
l-Malate

t, °C	M
S · 2Aq	
0	0.00044
10	0.00071
20	0.00121
30	0.00194
40	0.00290

$PbC_4H_4O_5$ (132)
dl-Malate

t, °C	M
S · Aq	
0	0.00044
10	0.00062
20	0.00088
30	0.00136
40	0.00178

$PbC_4H_4O_6$ (79, 132)
d-Tartrate

t, °C	M
S (79)	
0	0.000076
10	0.000083
20	0.000092
30	0.000108
40	0.000139
S (132)	
30	0.000028
50	0.000057
70	0.000102
90	0.000170

$PbC_4H_4O_6$ (132)
Racemate

t, °C	M
S · 4Aq	
0	0.000107
10	0.000058
20	0.000072
30	0.000126
40	0.000208

$Pb(CH_3CO_2)_2$ (134, 377)
Acetate

t, °C	M ± 1%
S · 3Aq	
0	0.606
10	0.901
20	1.362
25	1.676
30	2.14
40	3.58
50	6.80

$Pb(C_6H_5CO_2)_2$ (380)
Benzoate

t, °C	M
20	0.0035
30	0.0044
40	0.0055
50	0.0070

$PbC_{10}H_5NH_2(SO_3)_2$
Naphthylaminedisulfonates
v. p. 219

$Th(SO_4)_2$ (18, 24, 25, 117) (*See* Fig. 2)

t, °C	M ± 5%
S · 9Aq	
0	0.0174
10	0.0231
20	0.0324
30	0.0472
40	0.0707
55m	0.159
S · 9Aq + S · 4Aq	
43.6U	0.0813
S · 8Aq	
0m	0.0236
10m	0.0282
20m	0.0370
30m	0.0520
40m	0.0753
45m	0.0900
S · 8Aq + S · 4Aq	
43.0mU	0.0840
S · 4Aq	
40m	0.095
45	0.077
50	0.060
60	0.039
70	0.026
75	0.022

$Ga_2(SeO_4)_3$ (119)

t, °C	M
S · 16Aq	
25	1.01

$NH_4Ga(SO_4)_2$ (119)

t, °C	M
S · 12Aq	
25	1.10

TlOH (12)

t, °C	M ± 3%
S	
0	1.18
10	1.36
20	1.63
30	1.96
40	2.32
t, °C	M*
50	2.72
60	3.33
80	4.83
100	6.75

* Per l soln.

TlCl (36, 53, 178, 229, 364, 365, 366)

t, °C	M ± 1%
S	
0	0.0070
10	0.0097
20	0.0138
30	0.0189
40	0.0258
50	0.0340
60	0.0436
70	0.0549
80	0.0675
90	0.0824
100	0.1020

$TlClO_3$ (19, 342, 367)

t, °C	M ± 4%
S	
10	0.090
20	0.137
30	0.210
40	0.302
60	0.640
80	1.14

$TlClO_4$ (80)

t, °C	M
S	
0	0.197
10	0.265
20	0.415
30	0.630
40	0.910
60	1.72
80	2.68

TlBr (34, 364)

t, °C	M ± 3%
S	
30	0.00257
40	0.00392
50	0.0055
60	0.0072
70	0.0092

$TlBrO_3$ (366)

t, °C	M ± 0.5%
S	
39.75	0.02234

Tl_2SO_3 (35, 460)

t, °C	M
S	
15	0.0683

Tl_2SO_4 (36, 93, 98, 100, 244, 285, 367, 507); *cf.* (35)

t, °C	M ± 1%
S	
0	0.0534
10	0.0730
20	0.0962
30	0.1226
40	0.152
60	0.216
80	0.290
100	0.370

$Tl_2(SO_4)_3.Tl_2SO_4$ (35)

$Tl_2(SO_4)_3.(Tl_2SO_4)_5$ (35)

$TlOHSO_4.2H_2O$ (35)

Tl_2SeO_4 (187, 507)

t, °C	M ± 3%
S	
10	0.040
20	0.051
30	0.064
40	0.080
60	0.114
80	0.154
100	0.197

$TlNO_3$ (36, 144)

t, °C	M
S	
0	0.149
10	0.239
20	0.353
30	0.535
40	0.795
50	1.27
60	1.73
70	2.62
80	4.22
90	7.5
100	15.3
104.5	22.3

Tl_2CO_3 (285)

t, °C	M ± 10%
S	
10	0.094
20	0.118
30	0.147
40	0.183
60	0.267
80	0.363
100	0.472

$Tl_2C_2O_4$ (206)
Oxalate

t, °C	M ± 0.2%
S	
25	0.03755

$TlC_6H_2N_3O_7$ (403)
Picrate

t, °C	M ± 1%
S (red)	
0	0.00312
10	0.00560
20	0.00908
25	0.0110
30	0.0133
40	0.0189
S (red) + S (yellow)	
46.1U	0.0248
S (yellow)	
45	0.0241
50	0.0280
60	0.0390
70	0.0562

TlCNS (364, 366)

25	0.01494
39.75	0.02795

$ZnCl_2$ (356) (*See* Fig. 3)

t, °C	M ± 3%
S · 4Aq	
−60	7.6
−50	8.3
−40	9.3
S · 3Aq	
−10	13.9
0	15.3
+ 5	16.9
6.5	18.5
5m	20.7
S · 2.5Aq	
0	17.3
5	18.1
10	19.9
12.5	22.2
10m	25.7
6m	28.3
S · 1.5Aq	
− 5m	22.2
0m	22.7
+10m	24.3
20	27.0
25	30.0
S · Aq	
0m	25.1
10m	26.7

$ZnCl_2$.—(*Continued*)

t, °C	M ± 3%
S · Aq	
20m	29.1
25m	30.6
30	33.5
S	
25m	31.7
30	32.2
40	33.2
60	35.8
80	39.8
100	45.1
262	∞
S · 4Aq + S · 3Aq	
−30U	11.7
S · 3Aq + S · 2.5Aq	
6.5EU	18.5
S · 3Aq + S · 1.5Aq	
0mE	22.7
S · 2.5Aq + S · 1.5Aq	
11.5E	24.6
S · 2.5Aq + S · Aq	
9mE	26.4
S · 1.5Aq + S · Aq	
26U	31.0
S · 1.5Aq + S	
26.3mU	31.8
S · Aq + S	
28U	32.0

$Zn(ClO_3)_2$ (323, 357)

S · 6Aq	
−20	5.36
0	6.10
+10	7.11
15	8.00
S · 6Aq + S · 4Aq	
17.3U	8.53
S · 4Aq	
20	8.62
30	9.00
40	9.62
50	10.96
55	13.3

$ZnBr_2$ (123)

t, °C	M ± 2%
S · 3Aq	
−15	14.96
−10	16.24
− 5m	18.46
S · 3Aq + S · 2Aq	
− 8.7U	16.70
S · 2Aq	
−10m	16.64
0	17.26
+10	18.34
20	19.82
30	22.26
35	24.84
37m	27.75
S · 2Aq + S	
36.1U	26.04
S	
↓ 35m	26.00
↓ 95	29.52

ZnI_2 (123)

t, °C	M ± 3%
S · 2Aq	
−10	13.00
0	13.41
+10m	14.14
20m	15.59
25m	17.1
28m	18.5
S · 2Aq + S	
0.5U	13.45
S	
− 5m	13.43
0m	13.45
+15	13.52
30	13.72
45	14.12
100	15.94

$ZnSO_4$ (70, 74, 75, 92, 95, 106, 144, 199, 480) (*See* Fig. 4)

t, °C	M ± 0.2%
S · 7Aq(rhomb)	
− 5	2.434
0	2.595
+ 5	2.760
10	2.952
15	3.151
20	3.358
25	3.588
30	3.844
35	4.11
S · 7Aq(rhomb) + S · 6Aq	
39U	4.34
S · 7Aq(monocl)	
− 5m	2.916
0m	3.06
+ 5m	3.220
10m	3.37
15m	3.535
20m	3.715
S · 7Aq(monocl) + S · 6Aq	
25mU	3.940
S · 6Aq	
10m	3.635
20m	3.832
30m	4.07
40	4.36
50	4.76
60	5.27
S · Aq(?)	
100	5.0*
125	4.2*

* ± 10 %.

$Zn(NO_3)_2$ (174, 357)

t, °C	M ± 2%
S · 9Aq	
−25	3.53
−20	3.86
S · 9Aq + S · 6Aq	
−16.6U	4.30
S · 6Aq	
−15	4.37
−10	4.58
0	5.00
+10	5.55

$Zn(NO_3)_2$.—(*Continued*)

t, °C	M ± 2%
S · 6Aq	
20	6.23
30	7.29
35	8.30
36.4	9.24
35	9.88
33	10.23
S · 6Aq + S · 3Aq	
34E	10.03
S · 3Aq	
35	10.14
40	11.00
45	13.00
45.5	18.47

$ZnSO_4.(NH_4)_2SO_4$ (299)

t, °C	M
S · 6Aq	
25	0.48

$ZnC_4H_4O_6$ (79)
Tartrate

S · 2Aq	
↓ 15	0.0009
↓ 30	0.0022
40	0.0030
50	0.0038
60	0.0046
S · 2Aq + S · xAq	
63U(?)	0.0048(?)
S · xAq	
↓ 60m	0.0051
↓ 0	0.0018

$Zn(C_6H_5CO_2)_2$ (380)
Benzoate

15	0.086
20	0.080
30	0.069
40	0.060
50	0.053
60	0.047

$ZnC_{10}H_5NH_2(SO_3)_2$
Naphthylaminedisulfonates
v. p. 219

$Tl_2Zn(SO_4)_2$ (299)

t, °C	M
S · 6Aq	
25	0.129

CdF_2 (248)

25	0.29

$CdCl_2$ (123, 144) (*See* Fig. 5)

t, °C	M ± 3%
S · 4Aq	
−10	4.12
0m	5.33
+10m	6.83
15m	7.89
S · 4Aq + S · 2.5Aq	
− 6U	4.60
S · 4Aq + S · Aq	
13mU	7.38
S · 2.5Aq	
−10m	4.35
0	4.95

$CdCl_2$.—(*Continued*)

t, °C	M ± 3%
S · 2.5Aq	
+10	5.55
20	6.22
30	7.00
40m	7.9
S · 2.5Aq + S · Aq	
34.1U	7.40
S · Aq	
10m	7.38
30m	7.39
40	7.40
60	7.47
80	7.66
100	8.04±5%
120	8.8 ± 5%
140	9.8 ± 5%

$Cd(ClO_3)_2$ (323)

S · 2Aq	
−20	12.4
0	14.1
+20	15.9
40	18.1
60	21.4
65	23.4

$CdBr_2$ (123, 144)

S · 4Aq	
0	2.20
10	2.82
20	3.76
30	4.86
40m	6.3
S · 4Aq + S · Aq	
35.8U	5.60
S · Aq	
40	5.62
120	6.02

CdI_2 (94, 96, 123, 144)

t, °C	M ± 1%
S	
0	2.155
10	2.230
20	2.312
30	2.404
40	2.506
60	2.77
80	3.09
100	3.48
120	3.96
140	4.74
t, °C	M ± 0.1%
0.00	2.155
15.00	2.269
20.00	2.312
22.50	2.333
25.00	2.356
27.50	2.379
30.00	2.404
32.50	2.427
35.00	2.453
37.50	2.480
40.00	2.506

$CdSO_4$ (101, 260, 266, 358, 477)

t, °C	M ± 3%
S · 7Aq	
−20m	3.80
−10m	4.06
− 5m	4.51
t, °C	M ± 0.1%
S · 8/3Aq	
−15	3.616
0	3.620
+10	3.639
20	3.667
25	3.683
t, °C	M ± 2%
30	3.71
40	3.76
50	3.83
60	3.92
70	4.08
S · 8/3Aq + S	
74.5U	4.25
S	
75	3.85
80	3.34
85	3.14
90	3.03
100	2.92

$Cd(NO_3)_2$ (174)

t, °C	M ± 3%
S · 9Aq	
−12	2.60
− 4	3.27
0	4.11
+ 1m	4.72
2m	6.17
S · 9Aq + S · 4Aq	
0.9U	4.67
S · 4Aq	
0m	4.64
10	5.00
20	5.44
30	5.96
40	6.75
50	8.2
55	9.7
59.5	13.88

$CdCl_2.NH_4Cl$ (421)

t, °C	M
S	
0	1.78
20	2.20
40	2.70
60	3.22
80	3.70
100	4.40

$CdBr_2.NH_4Br$ (422)

S	
0	3.13
10	3.31
20	3.62
30	4.00
40	4.45
50	4.96
75	6.35
100	7.90

$CdBr_2.4NH_4Br$ (422)

t, °C	M
S	
160	9.9

$CdSO_4.(NH_4)_2SO_4$ (299)

S · 6Aq	
25	2.14

HgO (177, 240, 446)

t, °C	M ± 3%
25	0.000233

$HgCl_2$ (124, 160, 201, 225, 337, 341, 374, 398, 457, 461, 497, 502)

t, °C	M ± 10%
0	0.170
10	0.204
20	0.246
30	0.300
40	0.366
50	0.466
60	0.554
70	0.714
80	0.98
90	1.41
100	2.06

$HgBr_2$ (223, 225, 335, 461)

t, °C	M ± 1%
25	0.0170

HgI_2 (223)

t, °C	M
S	
25	0.00013

Hg_2SO_4 (131)

S	
25	0.00117

$HgCH_3CO_2$ (283)

Acetate	
21	0.00395

$Hg(CN)_2$ (223, 261, 461)

S	
20	0.376
25	0.445

$CuCl_2$ (140, 144, 317, 407, 425, 450, 451, 457)

t, °C	M ± 2%
S · 2Aq	
−20	4.53
+20	5.58
25	5.70
70	6.96
90	7.56

$Cu(ClO_3)_2$ (51,* 323)

t, °C	M ± 3%
S · 4Aq	
−30	5.26
−20	5.58
−10	5.88
0	6.22
+10	6.62
20	7.06
30	7.60
40	8.18
50	8.94
60	9.94

$Cu(ClO_3)_2$.—(*Continued*)

t, °C	M ± 3%
S · 4Aq	
71.05	13.88
71	14.14

* Found S · 6Aq, M. P. 65°.

$CuSO_4$ (81, 91, 95, 106, 144, 164, 199, 221, 311, 318, 386, 447, 450, 451, 480, 495, 496, 504)

t, °C	M ± 2%
S · 5Aq (α)	
− 1.6	0.85
0	0.88
+ 10	1.08
20	1.30
25	1.408
30	1.53
40	1.80
50	2.09
S · 5Aq (α) + S · 5Aq (β)	
56U	2.29
S · 5Aq(β)	
60	2.44
70	2.84
80	3.39
90	4.22
100	4.72
S · 5Aq + S · 3Aq?	
101U	4.79
S · 3Aq?	
110	4.88
120	4.98
130	5.08

CuS_2O_6 (11)

t, °C	M
S · 4Aq	
0	3.49
10	3.56
20	3.64
30	3.73

$Cu(NO_3)_2$ (144, 150, 174, 311)

t, °C	M ± 3%
S · 9Aq	
−23	3.01
−20m	3.69
S · 9Aq + S · 6Aq	
−20U	3.51
S · 6Aq	
−10	3.88
0	4.37
+10	5.18
20	6.56
25	7.95
26.4m	9.25
S · 6Aq + S · 3Aq	
25U	8.00
S · 3Aq	
30	8.15
40	8.52
50	8.98
60	9.55
70	10.25
80	11.08
100	13.28
114.5	18.50

$CuCl_2.2NH_4Cl$ (317)

t, °C	M ± 2%
S · 2Aq	
−10	1.06
0	1.18
+10	1.30
20	1.44
30	1.61
40	1.81
50	2.06
60	2.34
70	2.69
80	3.17

$CuSO_4.(NH_4)_2SO_4$ (81, 447, 451)

t, °C	M
S · 6Aq	
20	0.682
30	0.876
40	1.076
50	1.304
60	1.67

$CuC_4H_4O_6$ (79)
Tartrate

t, °C	M × 10^3
S · 3Aq	
15	1.06
20	2.00
30	4.2
40	6.8
50	9.5
S · 3Aq + S · *x*Aq	
52?U	10.1?
S · *x*Aq	
60	9.1
70	7.9
80	6.8
90	5.7

$CuSO_4.Tl_2SO_4$ (299)

t, °C	M
S · 6Aq	
25	0.122

Ag_2O (369)

S	
25	0.000217

AgF (198) (*See* Fig. 6)

t, °C	*x* ± 2%
S · 4Aq	
−15	0.0780
− 5	0.0974
0	0.110
+10	0.146
18	0.186
19m	0.200
S · 4Aq + S · 2Aq	
18.65U	0.194
S · 2Aq	
15m	0.189
20	0.196
25	0.203
35	0.222
S · 2Aq + S	
39.5U	0.240

AgF.—(*Continued*)

t, °C	*x* ± 2 %
S	
40	0.240
60	0.234
80	0.230
100	0.226
S · ⅔Aq	
0m	0.194
10m	0.206
20m	0.219
25m	0.228
S · ⅔Aq + S · Aq	
27mU	0.233
S · Aq	
15m	0.230
25m	0.232
35m	0.238
S · Aq + S	
38.2mU	0.241

$AgClO_3$ (290)

t, °C	M ± 5%
S	
0	0.0097
10	0.0165
20	0.0236
40	0.0397
60	0.061
80	0.088
100	0.123

$AgClO_4$ (230, 231)

t, °C	M ± 2%
S · Aq	
0	21.0
↓ 20	25.2
30	27.7
↓ 50	32.9
S · Aq + S	
50?U	32.9?
S	
60	34.1
↓ 100	38.4

$AgBrO_3$ (229, 364, 406)

t, °C	M ± 1%
S	
25	0.00830
30	0.00963
40	0.01340
50	0.01836
60	0.0242
70	0.0312
80	0.0397
90	0.0562

$AgIO_3$ (232, 369)

t, °C	M
S	
25	0.000181

Ag_2SO_4 (24, 145, 206, 232, 436)

t, °C	M ± 1%
S	
10	0.0220
20	0.0254
30	0.0283
50	0.0340
70	0.0390

Ag_2SO_4.—(*Continued*)

t, °C	M ± 1%
S	
80	0.0413
100	0.0453

$AgNO_2$ (2, 109, 294, 362)

t, °C	M ± 3%
S	
0	0.0102
10	0.0146
20	0.0222
25	0.0270
30	0.0329
40	0.0466
50	0.0641*
60	0.0897*

* May be in error due to decompn.

$AgNO_3$ (144, 202, 275, 312, 329, 455, 495)

t, °C	M ± 2%
S	
−5	5.60
0	6.65
+5	7.80
10	9.20
15	10.75
20	12.30
25	14.00
30	15.95
t, °C	*x* ± 10%
40	0.259
50	0.30
75	0.41
100	0.51
125	0.62
150	0.73

$AgNO_3.NH_4NO_3$ (455)

t, °C	M
S	
30	16.7

$AgCH_3CO_2$ (9, 190, 232, 259, 405)
Acetate

t, °C	M ± 2%
S	
0	0.0432
10	0.0522
20	0.0620
25	0.0670
30	0.0726
40	0.0842
50	0.0978
60	0.1130
70	0.1302
80	0.1502

$AgC_2H_5CO_2$ (9, 190, 259, 405)
Propionate

S	
0	0.0278
10	0.0372
20	0.0460
25	0.0501
↓ 50	0.0738
60	0.0840
70	0.0960
80	0.1120

$Ag_2C_4H_4O_5$ (384)
Malate

t, °C	M ± 10%
18	0.0034
25	0.0035

$Ag_2C_4H_4O_6$ (384)
Tartrate

18	0.055
25	0.056

$AgC_3H_7CO_2$ (9, 405)
Butyrate

t, °C	M ± 5%
S	
10	0.0215
20	0.0249
30	0.0289
50	0.0380
70	0.0492
80	0.0582

$AgC_3H_7CO_2$ (190, 405)
Isobutyrate

t, °C	M ± 3%
S	
0	0.038
10	0.044
20	0.050
↓ 60	0.076
70	0.085
80	0.091

$AgC_4H_9CO_2$ (458)
Methylethylacetate

t, °C	M
S	
10	0.0532
20	0.0540
30	0.0566
40	0.0643
50	0.0768
60	0.0876
70	0.1000

$AgC_4H_9CO_2$ (478)
Trimethylacetate

S	
0	0.0525
10	0.0552
20	0.0584
30	0.0620
40	0.0659
50	0.0700
60	0.0750
70	0.0804

$AgC_4H_9CO_2$ (9, 176)
Valerate

S	
0	0.0108
10	0.0124
17 (9)	0.0094
20	0.0143
30	0.0167
40	0.0195
50	0.0228
60	0.0264
70	0.0304

$AgC_4H_9CO_2$ (458)
Isovalerate

t, °C	M
S	
0	0.0085
10	0.0101
20	0.0118
50	0.0172
70	0.0212

$AgC_6H_5CO_2$ (371)
Benzoate

S	
25	0.00115

$AgCH_2ClCO_2$ (9, 232)
Chloroacetate

S	
16.9	0.0646
25	0.0739

$C_5H_{11}NO_2.HAuCl_4$ (479)
Betaine chloroaurate

S	
0	0.035
20	0.060
40	0.126
60	0.250
80	0.416
90	0.507

$2C_5H_{11}NO_2.HAuCl_4$ (479)
Betaine chloroaurate, basic

S · Aq	
0	0.0084
20	0.0172
40	0.0420
80	0.114

OsO_4 (518)

20	0.254

$(NH_4)_2IrCl_6$ (7, 413)

t, °C	M ± 5%
S	
0	0.0118
10	0.0166
20	0.0224
30	0.0286
40	0.0360
50	0.0440
60	0.0550
70	0.0690
80	0.092

$(NH_4)_2PtCl_6$ (7)

t, °C	M ± 4%
S	
0	0.0066
20	0.0113
30	0.0144
40	0.0182
60	0.0310
80	0.0500
100	0.0720

$(NH_4)_2PtBr_6$ (7)

t, °C	M ± 4%
S	
0	0.0056
20	0.0096
30	0.0118
40	0.0143
60	0.0213
80	0.0327
100	0.0497

RuO_4 (408.5)

$MnCl_2$ (115, 144, 416)

t, °C	M ± 3%
S · 4Aq(α)	
0	5.04
10	5.47
20	5.93
30	6.42
40	7.04
50	7.77
S · 4Aq(α) + S · 2Aq	
58.09U	8.63
S · 2Aq	
60	8.65
100	9.24

$MnBr_2$ (144, 282)

t, °C	M ± 10%
S · 4Aq*	
−20	5.1
0	5.8
+20	6.6
40	7.7
60	9.5
S · 4Aq + S · Aq	
64U	10.1
S · Aq	
70	10.2
85	10.5
100	10.7

* According to (282) S · 6Aq is given as stable form below 13°.

$MnSO_4$ (107, 411, 456)
(*See* Fig. 7)

t, °C	M ± 1%
S · 7Aq	
−10	3.18
0	3.53
+10m	3.97
15m	4.31
S · 7Aq + S · 5Aq	
9U	3.92
S · 7Aq + S · 4Aq	
14mU	4.20
S · 5Aq	
0m	3.76
10	3.94
20	4.16
30m	4.46
35m	4.70
S · 5Aq + S · 4Aq	
27U	4.36
S · 5Aq + S · Aq	
27U	4.36
S · 4Aq	
10m	4.17
20m	4.27
30m	4.40
40m	4.57
50m	4.80
S · 4Aq + S · Aq	
27U	4.36
S · Aq	
20m	4.49
30	4.31
40	4.10
50	3.85
60	3.60
70	3.32
80	3.02
90	2.52
100	2.39

$Mn(NO_3)_2$ (174)

t, °C	M ± 2%
S · 6Aq	
−30	4.02
−20	4.51
−10	5.05
0	5.68
+10	6.48
20	7.66
25	8.78
25.8	9.25
25	9.75
S · 6Aq + S · 3Aq	
23.6E	10.13
S · 3Aq	
25	10.34
30	11.5
35	15
35.5	18.5

$MnSO_4.(NH_4)_2SO_4$ (299)

t, °C	M
S · 6Aq	
25	1.33

MnC_2O_4 (536); Oxalate

$C_5H_{11}NO_2.HMnO_4$ (479)
Betaine permanganate

0	0.075
10	0.118
20	0.200
30	0.361
40	0.682
50	1.34
55	1.98

$FeCl_2$ (88, 144, 273)

t, °C	M ± 5%
S · 4Aq	
10	4.74
20	5.18
60	6.98
S · 4Aq + S · 2Aq	
65U	7.20
S · 2Aq	
70	7.32
110	8.26

$FeCl_3$ (21) (*See* Fig. 8)

t, °C	M ± 5%
S · 6Aq	
−50	3.10
−25	3.50
0	4.50
+10	5.08
20	5.68
30	6.60
35	7.54
37	9.25
35	11.00
30	12.88
20m	14.30
10m	14.88
S · 3.5Aq	
20m	12.60
25m	13.12
30	14.10
32.5	15.86
25m	17.28
S · 2.5Aq	
20m	15.52
40	17.90
50	19.48
55	21.10
56	22.20
S · 2Aq	
50m	22.1
60	22.9
70	24.6
73.5	27.8
70	30.9
65m	32.7
S(?)	
70	32.5
80	32.6
90	32.8
100	33.1
S · 6Aq + S · 3.5Aq	
27.4E	13.48
S · 6Aq + S · 2.5Aq	
14mE	14.66
S · 3.5Aq + S · 2.5Aq	
30E	16.76
S · 2.5Aq + S · 2Aq	
55E	22.50
S · 2Aq + S(?)	
66E	32.2

$FeBr_2$ (144)

t, °C	M
S · 6Aq	
−20	4.1
−10	4.3
+10	4.9
20	5.2
30	5.6
40	6.0
S · 6Aq + S · 4Aq	
48U(?)	6.34(?)
S · 4Aq	
50	6.4
70	6.9
100	8.2

$FeSO_4$ (144, 169, 447, 452, 453, 496) (*See* Fig. 9)

t, °C	M ± 2%
S · 7Aq	
0	1.030
10	1.35
20	1.74
30	2.16

$FeSO_4$.—(*Continued*)

t, °C	M ± 2%
S · 7Aq	
40	2.65
50	3.17
S · 7Aq + S · 4Aq	
56.6U	3.60
S · 7Aq + S · Aq	
60.3mU	3.85
S · 4Aq	
60	3.62
70m	3.69
S · 4Aq + S · Aq	
64U	3.66
S · Aq	
70	3.36
80	2.88
90	2.46

$Fe(NO_3)_2$ (174)

t, °C	M ± 3%
S · 9Aq	
−30	3.03
−20	3.18
−15	3.30
S · 9Aq + S · 6Aq	
?	?
S · 6Aq	
−10	3.63
0	3.93
+10	4.28
20	4.67
30	5.09
40	5.60
50	6.38
60.5	9.25

$NH_4Fe(SO_4)_2$ (299)

t, °C	M
S · 12Aq	
25	1.67

$FeSO_4.(NH_4)_2SO_4$ (299)

S · 6Aq	
25	1.05

$TlFe(SO_4)_2$ (298)

S · 12Aq	
25	0.80

$CoCl_2$ (88, 140, 144)

t, °C	M ± 3%
S · 6Aq	
−20	2.62
−10	2.90
0	3.20
+10	3.55
20	3.95
30	4.42
40	5.03
50	6.00
S · 6Aq + S · 2Aq	
(56U)	(7.30)
S . 2Aq	
60	7.30
70	7.39
80	7.52
90	7.70
100	7.96
110	8.35

$Co(ClO_3)_2$ (323)

t, °C	M ± 2%
S · 6Aq	
−20	5.10
−10	5.43
0	5.98
+10	7.09
S · 6Aq + S · 4Aq	
14.8U	7.85
S · 4Aq	
20	8.02
30	8.56
40	9.37
50	10.55
60	13.0
61	14.0

$Co(ClO_4)_2$ (188)

t, °C	M
−30	3.1
+20	4.1
30	4.3
40	4.5

$CoBr_2$ (144)

60	9.1
75	9.2
100	9.7

CoI_2 (50, 144)

0	7.6
40	10.2
80	12.9
120	14.2
160	15.6

Trans. pt. at 6.4°, data doubtful.

$Co(IO_3)_2$ (322) (*See* Fig. 10)

t, °C	M ± 2%
S · 4Aq	
0m	0.0132
10m	0.0170
20m	0.0208
30m	0.0253
40m	0.0303
50m	0.0363
60m	0.0465
65m	0.0541
S · 4Aq + S	
25m(?)	0.023(?)
S · 2Aq	
0	0.0078
10	0.0096
20	0.0113
30	0.0129
40	0.0148
50	0.0164
60	0.0182
70m	0.0200
80m	0.0218
90m	0.0235
100m	0.0252
S · 2Aq + S	
67U(?)	0.019(?)
S	
20m	0.0246

$Co(IO_3)_2$.—(*Continued*)

t, °C	M ± 2%
S	
30m	0.0220
50m	0.0202
75	0.0186
100	0.0171

$CoSO_4$ (266, 344, 496, 514)

S · 7Aq	
0	1.64
10	1.95
20	2.33
30	2.72
40	3.14
S · 7Aq + S · 6Aq	
40.7U	3.17
S · 6Aq	
50	3.49
↓ 100	5.25

$Co(NO_3)_2$ (174)

S · 9Aq	
−25	3.60
−23	3.75
−21m	4.00
S · 9Aq + S · 6Aq	
−22U	3.85
S · 6Aq	
−20	3.92
−10	4.24
0	4.61
+10	5.03
20	5.52
30	6.08
40	6.84
50	7.90
56	9.26
S · 6Aq + S · 3Aq	
55U	8.82
S · 3Aq	
60	9.2
70	10.1
80	11.3
90	14.3
91	18.5

$CoSO_4.(NH_4)_2SO_4$ (299)

t, °C	M
S · 6Aq	
25	0.52

$CoC_{10}H_5NH_2(SO_3)_2$
Naphthylaminedisulfonates
v. p. 219

$NiCl_2$ (88, 144, 163)

t, °C	M ± 3%
S · 6Aq	
−20	3.3
0	3.9
+20	4.6
40	5.3
60	6.1
S · 6Aq + S · *x*Aq	
72U	6.7
S · *x*Aq	
80	6.7
100	6.8

$Ni(ClO_3)_2$ (323)

t, °C	M ± 2%
S · 6Aq	
−20	4.30
−10	4.60
0	4.93
+10	5.37
20	5.94
30	6.9
40	8.5
S · 6Aq + S · 4Aq	
43U	9.1
S · 4Aq	
50	9.4
60	9.8
70	10.5
79.5	13.7

$Ni(ClO_4)_2$ (188)

t, °C	M
S · 9Aq(?)	
−30	3.5
↓ +20	4.3
30	4.4
40	4.6

$NiBr_2$ (49, 144)

t, °C	M ± 10%
S · 6Aq(?)	
0	5.1
20	6.1
S · 6Aq + S · 3Aq(?)	
28.5U	6.6
S · 3Aq(?)	
40	6.6
60	6.8
80	7.0
100	7.4

NiI_2 (144)

S · 6Aq(?)	
0	4.0
20	4.7
40	5.6
S · 6Aq(?) + S · *x*Aq	
43U	5.7
S · *x*Aq	
50	5.7
70	5.9
90	6.1

$Ni(IO_3)_2$ (322) (*See* Fig. 11)

t, °C	M ± 5%
S · 4Aq	
0m	0.0181
10m	0.0215
20m	0.0264
30m	0.0350
S · 2Aq(α)	
0m	0.0130
10m	0.0147
20m	0.0173
30m	0.0213
40m	0.0296
50m	0.0443
S · 2Aq(α) + S	
38mU	0.027

$Ni(IO_3)_2$.—(*Continued*)

t, °C	M ± 5%
S · 2Aq(β)	
0	0.0128
20	0.0144
40	0.0170
60	0.0213
80m	0.0277
S · 2Aq(β) + S	
74U	0.025
S	
30m	0.0281
50m	0.0265
70m	0.0255
90	0.0245

$NiSO_4$ (476)

t, °C	M ± 3%
S · 7Aq	
− 5	1.66
+10	2.06
20	2.37
30	2.76
35m	2.99
S · 7Aq + S · 6Aq(α)	
31.5U	2.82
S · 6Aq(α)	
35	2.84
40	2.93
50	3.24
S · 6Aq(α) + S · 6Aq(β)	
53.6U	3.39
S · 6Aq(β)	
55	3.41
60	3.65
100	4.79

α is blue; β is green.

$Ni(NO_3)_2$ (174)

S · 9Aq	
−25	3.36
−20	3.66
−15m	3.99
−10m	4.38
S · 9Aq + S · 6Aq	
−16.2U	3.80
S · 6Aq	
−20m	3.69
−10	4.00
0	4.35
+20	5.27
40	6.67
50	7.72
56.7m	9.25
S · 6Aq + S · 3Aq	
54.5U	8.50
S · 3Aq	
60	8.90
70	9.76
80	10.8
90	12.9
95	18.6

$NiSO_4.(NH_4)_2SO_4$ (299)

t, °C	M
S · 6Aq	
25	0.265

$NiC_{10}H_5NH_2(SO_3)_2$
Naphthylaminedisulfonates
v. p. 219

$NiSO_4.Tl_2SO_4$ (299)

t, °C	M
S · 6Aq	
25	0.070

CrO_3 (72, 182, 264, 269, 358, 449)

t, °C	M ± 2%
S	
0	16.2
20	16.8
40	17.5
60	18.3
80	19.3
100	20.5
120	23.0

$(NH_4)_2CrO_4$ (449)

t, °C	M
S	
30	2.66

$(NH_4)_2Cr_2O_7$ (336, 449)

t, °C	M ± 2%
S	
15	1.22
20	1.38
25	1.59
30	1.87

$NH_4Cr(SO_4)_2$ (263, 298)

S · 12Aq	
0	0.150
10	0.240
20	0.342
30	0.470
40	0.662

$TlCr(SO_4)_2$ (298)

t, °C	M
S · 12Aq	
25	0.212

Ag_2CrO_4 (523)

t, °C	M ± 20%
20	8.3×10^{-5}
50	16.5×10^{-5}

UO_2Cl_2 (355)

t, °C	M
18	21.9

$(UO_2)SO_4$ (372)

S · 3Aq	
13	0.461
16	0.513

$U(SO_4)_2$ (183)

S · 8Aq	
93	3.99
90	3.50
80	2.38
70	1.74
60	1.30
50	0.96
40	0.65
30	0.430
20	0.283
S · 8Aq + S · 4Aq	
18U	0.270

$U(SO_4)_2$.—(*Continued*)

t, °C	M
S · 4Aq	
20	0.263
60	0.162

$UO_2(NO_3)_2$ (509)

S · 6Aq	
−20	1.96
−10	2.21
0	2.48
+10	2.79
20	3.17
30	3.63
40	4.28
50	5.19
S · 6Aq + S · 3Aq	
60.2U	6.4

$UO_2C_2O_4$ (103, 126)
Oxalate

S · 3Aq(?)	
15	0.0132
25	0.0180
50	0.0282

$UO_2(HCO_2)_2$ (108)
Formate

S · Aq	
15	0.200*

* Per l soln.

$UO_2(CH_3CO_2)_2$ (108)
Acetate

S · 2Aq	
17	0.200

$UO_2(C_2H_5CO_2)_2$ (108)
Propionate

S · 2Aq	
19	0.204

$UO_2(C_3H_7CO_2)_2$ (108)
Butyrate

S · 2Aq	
17	0.237

$UO_2(C_3H_7CO_2)_2$ (108)
Isobutyrate

S · 2Aq	
20	0.096

$UO_2(C_4H_9CO_2)_2$ (108)
Isovalerate

S · 2Aq	
14	0.078

$NH_4V(SO_4)_2$ (299)

S · 12Aq	
25	1.22

$TlV(SO_4)_2$ (298)

S · 12Aq	
25	0.58

H_3BO_3 (10, 220, 224, 361)
v. also p. 251

S	
0	0.429
10	0.582
20	0.800
30	1.076
40	1.420
50	1.862

H_3BO_3.—(*Continued*)

t, °C	M
S	
60	2.390
70	3.00
80	3.81
90	4.90
100	6.38

$(NH_4)_2B_4O_7$ (441)

0	0.203
10	0.289
20	0.424
25	0.516

$Al_2(SO_4)_3$ (57, 271, 398)

t, °C	M ± 3%
S · 18Aq	
0	0.92
10	0.98
20	1.06
30	1.18
40	1.34
50	1.52
60	1.73
100	2.60

$Al(NO_3)_3$ (243)

t, °C	M
S · 18Aq	
25	3.01

$NH_4Al(SO_4)_2$ (298, 398)

t, °C	M ± 4%
S · 12Aq	
0	0.088
10	0.202
20	0.324
30	0.460
40	0.628
50	0.848
60	1.13
70	1.48
80	1.93
90	2.48
100	3.14

$N_2H_4.AlH(SO_4)_2$ (472)
Hydrazine aluminium sulfate

t, °C	M
S . 12Aq	
25	1.27

$TlAl(SO_4)_2$ (36, 298)

S · 12Aq	
0	0.075
10	0.104
20	0.154
30	0.223
40	0.340
50	0.540
60	0.840

$Sc_2(SO_4)_3$ (528)

S · 5Aq	
25	1.05

YCl_3 (110, 524*)

0	3.80
20	3.85
80	4.00

* In (524) are given values *ca.* 2.5 % higher.

YBr_3 (110)

t, °C	M
0	1.96
20	2.32
40	2.70
60	3.10
80	3.53
100	4.02

$Y_2(SO_4)_3$ (110)

0	0.179
20	0.154
40	0.127
100	0.035

$Y(NO_3)_3$ (110)

0	3.39
10	4.03
20	4.68
30	5.32
70	7.90

$La(IO_3)_3$ (209, 423)

S	
25 (209)	0.001031
25 (423)	0.00254

$La_2(SO_4)_3$ (353, 526)

t, °C	M ± 10%
S · 9Aq	
0	0.0534
10	0.0469
20	0.0405
30	0.0348
40	0.0297
50	0.0253
60	0.0220
70	0.0191
80	0.0167
90	0.0143
100	0.0122

$La(NO_3)_3$ (250)

t, °C	M
25	4.65

$La(CH_3CO_2)_3$ (510)

Acetate

18	0.65

$Ce(IO_3)_3$ (423)

S	
25	0.0022

$Ce_2(SO_4)_3$ (262, 526) (*See* Fig. 12)

t, °C	M ± 2%
S · 12Aq	
0	0.291
10m	0.300
20m	0.310
S · 9Aq	
0m	0.369
10m	0.253
20m	0.176
30	0.129
40	0.101
50m	0.0822
60m	0.0682
S · 8Aq	
0m	0.336
10	0.232

$Ce_2(SO_4)_3$.—(*Continued*)

t, °C	M ± 2%
S · 8Aq	
20	0.169
30m	0.130
40m	0.105
50m	0.0841
60m	0.0712
S · 5Aq	
45m	0.155
55m	0.0765
70m	0.0339
80m	0.0216
90m	0.0142
100m	0.0088
S · 4Aq	
35m	0.149
40m	0.108
50	0.0605
60	0.0379
70	0.0260
80	0.0187
90	0.0129
100	0.0079
S · 12Aq + S · 9Aq	
6.0mU	0.296
S · 12Aq + S · 8Aq	
3.7U	0.294
S · 9Aq + S · 8Aq	
27.5U	0.138
S · 9Aq + S · 5Aq	
55.7mU	0.0739
S · 9Aq + S · 4Aq	
41.8U	0.0975
S · 8Aq + S · 5Aq	
54.9mU	0.0772
S · 8Aq + S · 4Aq	
40.9mU	0.1025

$Ce_2(SeO_4)_3$* (86)

t, °C	M
0	0.56
20	0.50
40	0.46
60	0.19
80	0.07
100	0.03

* Hydration and stability of solid phase uncertain.

$(NH_4)_2Ce(NO_3)_5$ (530)

S · 4Aq	
10	5.0
20	5.7
30	6.6
40	7.7
50	9.6
S · 4Aq + S · xAq	
56U(?)	11.7(?)
S · xAq	
60	14.0
65	16.8

$(NH_4)_2Ce(NO_3)_6$ (530)

S	
25	2.60
30	2.76
40	3.04
50	3.31

$(NH_4)_2Ce(NO_3)_6$.—(*Cont'd*)

t, °C	M
S	
60	3.56
70	3.79
80	4.01
90	4.23

$NH_4Ce(SO_4)_2$ (530)

S · 4Aq	
20m?	0.154
30m?	0.149
40m	0.145
50m	0.140
S · 4Aq + S	
20(?)U	0.15(?)
S	
40	0.093
50	0.075
60	0.060
70	0.046
80	0.036
90	0.030

$Ce(HCO_2)_3$ (530)

Formate

15	0.0145
75	0.0136

$Ce(CH_3CO_2)_3$ (530)

Acetate

15	0.77
75	0.47

$Ce(C_2H_5CO_2)_3$ (530)

Propionate

15	0.65
75	0.53

$Ce(C_3H_7CO_2)_3$ (530)

Butyrate

15	0.088
75	0.050

$Ce(C_3H_7CO_2)_3$ (530)

Isobutyrate

20	0.176
75	0.087

$PrCl_3$ (314)

15	4.2

$Pr_2(SO_4)_3$ (353, 442)

S · 8Aq	
0m?	0.35
10m?	0.29
20m?	0.24
30m?	0.20
40m?	0.15
50m?	0.14
60m?	0.11
70m?	0.085
80m?	0.061
S · 5Aq	
85	0.028
90	0.023
95	0.019
S	
0m	0.415(?)
20m	0.311(?)

$Pr(NO_3)_3.3Zn(NO_3)_2.24Aq$ (402.5)

$Pr(NO_3)_3.3Co(NO_3)_2.24Aq$ (402.5)

$Pr(NO_3)_3.3Ni(NO_3)_2.24Aq$ (402.5)

$NdCl_3$ (313, 314, 524)

t, °C	M
10	3.86
20	3.91
30	3.97
40	4.05
50	4.27
100	5.6

$Nd_2(SO_4)_3$ (353, 526)

t, °C	M
S · 8Aq	
0	0.166
10	0.136
20	0.111
30	0.090
40	0.075
60	0.057
80	0.047
100	0.039

$Nd(NO_3)_3.3Zn(NO_3)_2.24Aq$ (402.5)

$Nd(NO_3)_3.3Co(NO_3)_2.24Aq$ (402.5)

$Nd(NO_3)_3.3Ni(NO_3)_2.24Aq$ (402.5)

$SaCl_3$ (524)

t, °C	M
10	3.59
20	3.64
30	3.68
40	3.77
50	3.90

$Sa_2(SO_4)_3$ (528)

S · 8Aq	
25	0.060

$Gd_2(SO_4)_3$ (33, 41, 526)

S · 8Aq	
0	0.068
10	0.053
20	0.044
30	0.038
40	0.034

$Er_2(SO_4)_3$ (528)

S · 8Aq	
25	0.22

$Yb_2(SO_4)_3$ (89)

S · 8Aq	
0	0.71
10	0.58
20	0.46
30	0.36
40	0.27
50	0.21
60	0.16
70	0.13
80	0.11
90	0.09
100	0.07

Rare Earth Bromates (249.5)

Solid Phase $R(BrO_3)_3 \cdot 9Aq$

Wt. % of $R(BrO_3)_3 \cdot 9Aq$ in solution

°C \ R	La	Pr	Nd	Sa	Gd	Tb
0	64.8	47.0	39.9	33.2	33.4	39.9
5	68.2	51.4	44.5	37.6	37.5	43.6
10	71.5	55.3	48.6	42.0	41.2	47.3
15	74.9	59.0	52.7	46.2	45.3	50.6
20	78.4	62.7	56.3	50.2	48.9	53.9
25	82.2	66.2	60.2	54.0	52.5	57.1
30	87.3	69.8	63.8	57.5	55.8	60.3
35	91.4	73.6	67.3	61.1	59.1	63.4
40		77.2	70.2	64.7	62.4	66.5
45		81.3	74.4	68.2	66.2	69.4

Bromonitrobenzenesulfonates of Rare Earths (255)

A = $(C_6H_3BrNO_2SO_3)$

t = 25°C

	M
$TaA_3 \cdot 12Aq$	0.0674
$YA_3 \cdot 10Aq$	0.0653
$LaA_3 \cdot 8Aq$	0.0509
$CeA_3 \cdot 8Aq$	0.0598
$PrA_3 \cdot 8Aq$	0.0618
$NdA_3 \cdot 8Aq$	0.0735
$SaA_3 \cdot 10Aq$	0.0790
$EuA_3 \cdot 10Aq$	0.0677
$GdA_3 \cdot 10Aq$	0.0630
$ErA_3 \cdot 12Aq$	0.0639
$YbA_3 \cdot 12Aq$	0.0774

Dimethylphosphates of Rare Earths (340)

A = $(CH_3)_2PO_4$

t = 25°C

	M
YA_3	0.0603
LaA_3	2.02
CeA_3	1.544
PrA_3	1.242
NdA_3	1.080
SaA_3	0.670
GdA_3	0.449
ErA_3	0.0330
YbA_3	0.0219

$(NH_4)_2HfF_6$ (227)

t, °C	M*
0	0.897
20	1.420

Hf = 178.6.

* Per 1 soln.

$(NH_4)_3HfF_7$ (227)

0	0.418
20	0.587

$BeSO_4$ (56, 59, 268, 291, 527)

t, °C	M
S · 4Aq(?)	
25	4.00
30	4.15
40	4.50
50	5.00
60	5.50
70	6.10
80	6.8

$BeSO_4$.—(Continued)

t, °C	M
S · 4Aq(?)	
90	7.8
100	9.4
110	11.8
S · 4Aq + S · 2Aq	
113(?)	13.0(?)
S · 2Aq(?)	
80(m?)	8.0
90(m?)	9.2
100(m?)	10.5
110(m?)	12.3
S · 6Aq(?)	
25	4.8*
25	0.78†

Little agreement as to compn. of phases or solubilities.

* (291). † (527).

$MgCl_2$ (40, 44, 139, 236, 426, 482) (*See* Fig. 13)

t, °C	M ± 2%*
S · 12Aq	
−35	2.68
−30	2.99
−25	3.32
−20	3.80
−16.4	4.63
S · 12Aq + S · 8Aq(α)	
−16.8E	4.86
S · 12Aq + S · 8Aq(β)	
−17.4mE	5.00
S · 12Aq + S · 6Aq	
−19.4mE	5.24
S · 6Aq + S · 8Aq(β)	
− 9.6mU	5.39
S · 6Aq + S · 8Aq(α)	
− 3.4U	5.49
S · 6Aq	
0	5.50
20 ↓	5.76
60	6.39
80	6.82
100	7.59
S · 6Aq + S · 4Aq	
116.7U	8.98
S · 4Aq	
120	9.07
140	9.60

$MgCl_2$.—(Continued)

t, °C	M ± 2%*
S · 4Aq	
160	10.39
180	12.69
S · 4Aq + S · 2Aq	
181.5U	13.21
S · 2Aq	
186	13.34

* Below 100°.

$Mg(ClO_3)_2$ (80, 323, 357)

t, °C	M ± 3%
S · 6Aq	
−20	5.54
−10	5.71
0	5.96
+10	6.30
20	6.87
30	8.03
35m	9.15
35.1m	9.25
S · 6Aq + S · 4Aq	
32U(?)	8.4(?)
S · 6Aq + S · 2Aq	
35mE	9.45
S · 4Aq	
42	9.21
65.5	11.70
S · 2Aq	
40m	9.90
50m	10.81
60m	11.78
70m	12.80

$MgBr_2$ (320, 357)

t, °C	M
S · 6Aq	
0	4.99
20	5.25
40	5.55
60	5.84
80	6.16
100	6.53
120	6.94
140	7.52
150	8.00
160	8.70
164	9.25

MgI_2 (320, 357)

S · 8Aq	
0	4.35
20	5.03
30	5.48
40	6.20
43.5m	6.94
S · 8Aq + S · 6Aq	
43.0	6.54
S · 6Aq	
60	6.62
↓ 140	6.90
160	7.01
180	7.17
200	7.37
220	7.70

$Mg(IO_3)_2$ (357, 358)

t, °C	M ± 4%
S · 10Aq	
0	0.084
10	0.152
20m	0.306
30m	0.566
35m	0.752
S · 10Aq + S · 4Aq	
13.9U	0.200
S · 4Aq	
0m	0.158
20	0.222
40	0.254
60	0.380
80	0.480
100	0.606

$MgSO_4$ (26, 44, 70, 144, 180, 199, 202, 217, 237, 247, 301, 447, 482, 496, 522)

t, °C	M
S · 12Aq	
− 3.9	1.95
S · 12Aq + S · 7Aq	
+ 1.8U	2.22
S · 7Aq	
10	2.53
20	2.88
30	3.30
40	3.70
S · 7Aq + S · 6Aq	
48.2U	4.10
S · 6Aq	
50	4.15
60	4.55
S · 6Aq + S · Aq	
68U	4.88
S · Aq	
80	5.3
100	5.9
120	6.6

MgS_2O_6 (11)

S · 6Aq	
0	2.54 ± 2%
10	2.67 ± 2%
20	2.80 ± 2%
30	2.93 ± 2%

$Mg(NO_3)_2$ (174, 247, 357)

t, °C	M ± 2%
S · 9Aq	
−25	3.64
−20	3.88
S · 9Aq + S · 6Aq	
−18U	4.14
S · 6Aq	
−10	4.28
0	4.48
+20	5.00
40	5.66
60	6.52
80	7.72
90	9.25
85	12.2
80	13.0
70	13.8

$MgSO_4.(NH_4)_2SO_4$ (299, 303, 402)

t, °C	M
S · 6Aq	
0	0.468
10	0.580
20	0.710
30	0.859
40	1.023
60	1.391
80	1.911
100	2.60

$MgCO_3$ (*v.* Vol. III, p. 377)

$MgC_4H_4O_4$ (484)
Succinate

15	2.29
100	14.1

$MgC_4H_4O_5$ (132)
l-Malate

S · 3Aq	
0	0.132
10	0.146
20	0.159
30	0.173
40	0.186

$MgC_4H_4O_5$ (132)
dl-Malate

S · 2.5Aq	
0	0.060
10	0.068
20	0.076
30	0.084
40	0.092

$MgC_4H_4O_6$ (132)
Tartrate

S · 4Aq	
0	0.0313
10	0.0457
20	0.0610
30m	0.0782
37.5m	0.0963
S · 4Aq + S · 2Aq	
26U	0.071
S · 2Aq	
10m	0.078
20m	0.074
30	0.068
40	0.059

$MgC_4H_4O_6$ (132)
Racemate

S · 5Aq	
0	0.0235
10	0.0317
20	0.0420
30	0.0541
40	0.0680

$Mg(C_6H_5CO_2)_2$ (484)
Benzoate

15	0.23
100	0.74

$Mg(C_6H_5CH{:}CHCO_2)_2$ (484)
Cinnamate

15	0.027
100	0.062

$MgC_{10}H_5NH_2(SO_3)_2$
Naphthylaminedisulfonates
v. p. 219

Mg_2GeO_4 (350)

t, °C	M
26	0.000087

$MgCl_2.2CdCl_2$ (421)

t, °C	M ± 3%
S · 12Aq	
0	1.80
20	2.11
↓ 80	3.16
100	3.57
120	4.04

$MgCrO_4$ (357)

t, °C	M
S · 7Aq	
18	5.2

$Mg(NO_3)_2.Pr(NO_3)_3.24Aq$
(402.5)

$Mg(NO_3)_2.Nd(NO_3)_3.24Aq$
(402.5)

$Ca(OH)_2$ (27, 29, 77, 84, 215, 219, 226, 306, 419)

t, °C	M ± 3%
S	
0	0.0239
10	0.0230
20	0.0218
30	0.0202
↓ 100	0.0090
125	0.0052
150	0.0030
175	0.0018
200	0.0013

$CaCl_2$ (17, 22, 139, 279, 426)
(*See* Fig. 14)

t, °C	M ± 2%*
S · 6Aq	
− 50	3.92
− 40	4.13
− 30	4.36
− 20	4.64
− 10	4.96
0	5.35
+ 10	5.85
20	6.70
25	7.38
30.2m	9.25
S · 6Aq + S · 4Aq(α)	
30.0U	9.14
S · 6Aq + S · 4Aq(β)	
29.2mE	10.25
S · 4Aq(α)	
20m	8.17
35	9.74
40	10.41
S · 4Aq(α) + S · 2Aq	
45.5U	11.73
S · 4Aq(β)	
20m	9.41
30m	10.35
35m	10.92

$CaCl_2$.—(*Continued*)

t, °C	M ± 2%*
S · 4Aq(β) + S · 2Aq	
38.4mU	11.50
S · 2Aq	
40m	11.5
60	12.3
80	13.2
100	14.2
120	15.4
140	17.2
160	20.0
S · 2Aq + S · Aq	
175.5U	26.8
S · Aq	
200	28.0
220	29.0
240	29.9
S · Aq + S	
260U	30.5
t, °C† (296)	M
S · 6Aq	
29.31	10.02
29.49	9.875
29.64	9.754
29.71	9.661
29.76	9.610
29.80	9.552
29.83	9.501
29.87	9.439
29.89	9.375
29.91	9.320
29.92	9.265
29.92	9.219
29.93	9.151
29.90	9.091
29.85	9.010
29.80	8.923
29.73	8.838
29.65	8.726
29.53	8.618

* ±2 % below 100°.
† There may be an absolute error of 0.15°. The relative error seems to be 0.01°.

$Ca(ClO_3)_2$ (357)

t, °C	M
S · 2Aq	
18	8.6

$CaBr_2$ (279, 304)

t, °C	M ± 5%
S · 6Aq	
0	6.2
20	7.1
34.2	9.3
S · xAq	
40	10.6
60	13.9
105	15.6

CaI_2 (144, 279)

S · 6Aq	
− 20	5.60
9	6.20

CaI_2.—(*Continued*)

t, °C	M ± 5%
S · 6Aq	
+20*	7.00
40	8.30
60	10.2
S · xAq	
80	12.8
100	16.0

* There is a transition pt. *ca.* 40°. Detns. at higher t are very inaccurate.

$Ca(IO_3)_2$ (357, 358)

t, °C	M ± 3%
S · 6Aq	
0	0.0025
10	0.0040
20	0.0067
30	0.0105
40m	0.0156
50m	0.0228
60m	0.0326
S · 6Aq + S · Aq	
30.5U	0.0106
S · Aq	
20m	0.0088
40	0.0124
60	0.0160
80	0.0196
100	0.0231

CaS (420)

t, °C	M
20	0.00295

$CaSO_4$ (52, 145, 203, 208, 234, 240, 241, 319, 405, 495)

t, °C*	M†
S · 2Aq	
0	0.01292
10	0.01418
20	0.01510
25	0.01537
30	0.01548
35	0.01554
40	0.01553
60	0.01477
80	0.01361
100	0.01240
S(α)	
100	0.00625
125	0.00389
150	0.00220
175	0.00110
200	0.00059
S(β)	
100	0.01188
125	0.00662
150	0.00378
175	0.00220
200	0.00121

* At 107°, S · 2Aq → S · 0.5Aq. At 63.5°, S · 2Aq → S.
† Metastable equil. above 60°.

CaS_2O_3 (274)

t, °C	M
9	2.72

CaS_2O_6 (11, 245)

t, °C	M
S · 4Aq	
0	0.800
10	1.030
20	1.275
30	1.516

$CaSeO_4$ (144)

t, °C	M ± 10%
S · 2Aq	
0	0.43
10	0.45
20	0.45
30	0.43
↓ 70	0.28

$Ca(NO_2)_2$ (379)

t, °C	M ± 3%
S · 4Aq	
−10	4.26
0	4.68
+10	5.22
20	5.84
30	6.66
S · 4Aq + S · Aq	
40.3U	8.00
S · Aq	
50	8.98
60	10.14
70	11.58
80	13.8
90	18.1

$Ca(NO_3)_2$ (22, 28, 29, 77, 274, 357, 487) (*See* Fig. 15)

t, °C	M ± 1%
S · 4Aq(α) + Ice	
−28.7E	4.58
S · 4Aq(α)	
−20	4.98
−10	5.53
0	6.22
+10	7.00
20	7.88
25	8.41
30	9.31
35	10.32
40	11.94
42.7	13.90
S · 4Aq(α) + S · 3Aq	
42.5E	14.84
S · 4Aq(β)	
30m	9.78
35m	11.05
38m	12.19
39.6m	13.90
S · 4Aq(β) + S · 3Aq	
39.5mE	14.43
S · 3Aq	
40	14.43
45	15.25
50	17.15
51.1	18.5
50	20.2
S · 3Aq + S · 2Aq	
48.4E	21.3
S · 2Aq + S	
51.3U	21.65

$Ca(NO_3)_2$.—(*Continued*)

t, °C	M ± 1%
S	
20m	20.72
50m	21 7
75	22.0
100	22.1

$CaCO_3$ (*v.* Vol. III, p. 377)

$Ca(HCO_2)_2$ (267, 305)
Formate

t, °C	M ± 2%
S	
0	1.242
20	1.276
↓ 100	1.414

$CaC_3H_2O_4$ (328)
Malonate

t, °C	M
S	
0	0.0204
10	0.0232
20	0.0256
30	0.0278
40	0.0297
50	0.0311
60	0.0323
70	0.0332

$CaC_4H_4O_4$ (328, 332, 384)
Succinate

t, °C	M ± 2%
S · 3Aq	
0	0.0736
10	0.0773
20	0.0813
S · 3Aq + S · Aq	
29U	0.0850
S · Aq	
30	0.0838
↓ 70	0.0491
15(484)	0.083
100(484)	0.043

$CaC_4H_4O_4$* (328)
Isosuccinate

t, °C	M ± 5%
0	0.0334
10	0.0336
20	0.0331
30	0.0321
40	0.0305
50	0.0282
60	0.0252
70	0.0218

* The solid phase is unknown. There may be a transition pt.

$CaC_4H_4O_5$ (78, 132, 246, 384)
l-Malate

t, °C	M*
S · Aq	
0	0.040
20	0.050
40	0.046
60	0.042
80	0.038

* Little agreement. Probably a transition pt. *ca.* 20°.

$CaC_4H_4O_5$ (132)
dl-Malate

t, °C	M
0	0.0143
10	0.0160
20	0.0173
30	0.0189
40	0.0202

$CaC_4H_4O_6$ (132)*
Tartrate

t, °C	M
S · 4Aq	
0	0.0010
10	0.00133
20	0.00173
30	0.00220
40	0.00280

* According to (79) the values for M are much higher.

$CaC_4H_4O_6$ (132)
Racemate

t, °C	M
S · 4Aq	
0	0.00012
10	0.00016
20	0.00021
30	0.00026
40	0.00051

$Ca(CH_3CO_2)_2$ (267, 305)
Acetate

t, °C	M ± 2%
S · 2Aq	
0	2.37
10	2.27
20	2.20
30	2.14
40	2.10
60	2.07
80	2.12
S · 2Aq + S · Aq	
84U	2.14
S · Aq	
85	2.09
90	1.97
100	1.88

$Ca(C_2H_5CO_2)_2$ (267, 305)
Propionate

t, °C	M
S · Aq	
0	2.28
10	2.20
20	2.14
30	2.10
40	2.07
60	2.05
80	2.14
90	2.26
100	2.60

$Ca(C_3H_7CO_2)_2$ (82, 121, 216, 305)
Butyrate

t, °C	M ± 2%
S · Aq	
0	0.930
20	0.840
40	0.761
60	0.709
70	0.700
80	0.700
100	0.740

(**$Ca(C_3H_7CO_2)_2$.**—(*Continued*))

$Ca(C_3H_7CO_2)_2$ (82, 305, 458)
Isobutyrate

t, °C	M
S · 5Aq	
0	0.933
10	0.987
20	1.046
↓ 60	1.327
S · 5Aq + S · Aq	
62U	1.340
S · Aq	
70	1.30
80	1.26
90	1.24
100	1.22

$Ca(C_4H_9CO_2)_2$ (332,* 458)
Methylethylacetate

t, °C	M
0	1.19
20	1.39
40	1.45
60	1.37
70	1.27

* States that there are hydrates S · 5Aq, S · 3Aq, and S · Aq between 0–90°C, and S · 3Aq + S · Aq at *ca.* 40°.

$Ca(C_4H_9CO_2)_2$ (286)
Trimethylacetate

t, °C	M
S · 5Aq	
0	0.300
10	0.282
20	0.270
30	0.264
40	0.265
50	0.272
↓ 80	0.304

$Ca(C_4H_9CO_2)_2$ (176, 305)
n-Valerate

t, °C	M ± 3%
S · Aq	
0	0.408
10	0.383
20	0.363
30	0.346
40	0.335
60	0.326
80	0.328
100	0.366

$Ca(C_4H_9CO_2)_2$ (305, 458*)
Isovalerate

t, °C	M ± 3%
S · 3Aq	
0	1.075
10	0.937
20	0.900
30	0.895
40	0.908
S · 3Aq + S · Aq	
45.5U	0.923

$Ca(C_4H_9CO_2)_2$.—(*Continued*)

t, °C	M ± 3%
S · Aq	
50	0.824
60	0.759
70	0.718
80	0.697
90	0.687
100	0.683

* The data of (458) give a continuous curve with a maximum.

$Ca(C_6H_5CO_2)_2$ (474)
Benzoate

t, °C	M ± 1%
S · 3Aq	
0	0.0789
10	0.0873
20	0.0966
30	0.1071
40	0.1218
50	0.1447
60	0.168
70	0.202
80	0.244
90m	0.302
S · 3Aq + S · Aq(?)	
84.7U	0.270
S · Aq(?)	
80m	0.261
90	0.281
100	0.309
t, °C	M
15 (484)	0.33
100 (484)	0.40

$Ca(C_6H_5CH{:}CHCO_2)_2$ (253)
Cinnamate

2	0.0058
15*	0.0063
26	0.0084
100*	0.035

* According to (484).

$CaC_{10}H_5NH_2(SO_3)_2$
Naphthylaminedisulfonates
v. p. 219

$CaCrO_4$ (360) (*See* Fig. 16)

t, °C	M
S · 2Aq(α)	
0m	1.12
10m	0.99
20m	0.97
30m	0.93
40m	0.87
45m	0.815
S · 2Aq(β)	
0m	0.695
10m	0.716
20m	0.732
30m	0.744
40m	0.744
S · 2Aq(β) + S · Aq	
14mU	0.72
S · Aq	
0m	0.84
20m	0.68
40m	0.53

$CaCrO_4$.—(*Continued*)

t, °C	M
S · Aq	
60m	0.40
80m	0.270
100m	0.204
S · 0.5Aq	
0m	0.44
20m	0.29
40m	0.165
60m	0.084
80m	0.055
100m	0.049
S	
0	0.26
20	0.16
40	0.10
60	0.058
80	0.035
100	0.028

$Sr(OH)_2$ (419, 436, 444)

S · 8Aq	
0	0.0338
10	0.0463
20	0.0656
30	0.0975
40	0.145
50	0.209
60	0.302
70	0.439
80	0.72
85	0.96
90	1.34
95	1.75
100	2.28

$SrCl_2$ (139, 144, 201, 207, 275, 330, 347, 417, 494)

t, °C	M ± 2%
S · 6Aq	
−20	2.38
−10	2.58
0	2.81
+10	3.05
20	3.33
30	3.69
40	4.13
50	4.65
60	5.24
S · 6Aq + S · 2Aq	
61.34U	5.31
S · 2Aq	
70	5.54 ± 5%
80	5.82 ± 5%
90	6.08 ± 5%

$Sr(ClO_3)_2$ (357)

t, °C	M
S	
18	6.9

$SrBr_2$ (144, 210, 279, 330, 417)

t, °C	M ± 3%
S · 6Aq	
−10	3.22
0	3.46
+10	3.72
20	4.00

$SrBr_2$.—(*Continued*)

t, °C	M ± 3%
S · 6Aq	
30	4.31
40	4.65
50	5.02
60	5.42
70	6.00
80	6.93
S · 6Aq + S · 2Aq	
88.6U	8.54
S · 2Aq	
90	8.60
100	9.01
110	9.43

SrI_2 (144, 279, 330)

t, °C	M ± 5%
S · 6Aq	
−10	4.7
0	4.9
+10	5.1
20	5.3
30	5.5
40*	5.8*
50	6.0
60	6.4
70	6.9
80	7.8
S · 6Aq + S · *x*Aq	
84(?)U	9.3(?)
S · *x*Aq	
100	10.5

* Above 40° ± 10 %.

SrS_2O_6 (11)

t, °C	M
S · 4Aq	
0	0.191
10	0.315
20	0.487
30	0.702

$Sr(SH)_2$ (489)

t, °C	M ± 2%
S · 4Aq	
0	2.46
20	2.73
40	3.01
60	3.30
80	3.59
100	3.87

$Sr(NO_2)_2$ (379)

t, °C	M ± 3%
S · Aq	
− 5	2.75
+15	3.30
35	4.26
55	5.10
70	5.82
85	6.69
100	7.90

$Sr(NO_3)_2$ (37, 106, 112, 144, 155, 201, 275, 382)

t, °C	M ± 1%
S · 4Aq	
−10	1.40
0	1.89

$Sr(NO_3)_2$.—(*Continued*)

t, °C	M ± 1%
S · 4Aq	
+10	2.55
20	3.34
25	3.75
30	4.10
S · 4Aq + S	
31U	4.21
S	
40	4.30
60	4.46
80	4.62
100	4.80

$SrCO_3$ (*v.* Vol. III, p. 377)

$Sr(C_4H_4O_4)$ (484)
Succinate

t, °C	M
15	0.0216
100	0.0106

$SrC_4H_4O_5$ (78, 132)
l-Malate

S · 4Aq	
0	0.0090
10	0.0135
20	0.0191
30	0.0270
40	0.0397

$SrC_4H_4O_5$ (132)
dl-Malate

S · 2.5Aq	
0	0.0131
10	0.0144
20	0.0156
30	0.0214
40	0.0265

$SrC_4H_4O_6$ (79, 132)
Tartrate

S · 4Aq	
0	0.0042
10	0.0061
20	0.0080
30	0.0104
40	0.0130
50	0.0160
60	0.0194
70	0.0238
80	0.0290
90	0.0356

$SrC_4H_4O_6$ (132)
Racemate

S · 4Aq	
0	0.00045
10	0.00079
20	0.00111
30	0.00142
40	0.00173

$Sr(CH_3CO_2)_2$ (376)
Acetate

t, °C	M ± 0.5%
S · 4Aq	
0	1.80
5	1.94
10m	2.12

$Sr(CH_3CO_2)_2$.—(*Continued*)

t, °C	M ± 0.5%
S · 4Aq + S · 0.5Aq	
9.5U	2.10
S · 0.5Aq	
10	2.09
20	1.99
40	1.86
60	1.78
80	1.76
100	1.77

$Sr(C_6H_5CO_2)_2$ (380)
Benzoate

t, °C	M
15*	0.166
15	0.168
25	0.172
35	0.178
100*	0.180

* According to (484).

$Sr(C_6H_5CH{:}CHCO_2)_2$ (484)
Cinnamate

15	0.031
100	0.084

$SrC_{10}H_5NH_2(SO_3)_2$
Naphthylaminedisulfonates
v. p. 219

$Ba(OH)_2$ (221, 224, 330, 382, 410, 419, 434, 454, 465)

t, °C	M ± 2%
S · 8Aq	
0	0.099
5	0.125
10	0.158
15	0.193
20	0.233
25	0.275
30	0.330
40	0.48
50	0.76
60	1.24
65	1.58
70	2.24
S · 8Aq + S · 4(?)Aq	
78.0U	

$BaCl_2$ (139, 201, 312, 330, 344, 363, 447, 450, 453, 485)

S · 2Aq	
−10	1.46
0	1.52
+10	1.61
20	1.72
30	1.83
↓ 40	1.94
100	2.82

$Ba(ClO_2)_2$ (290)

t, °C	M ± 3%
0	1.61
20	1.62
40	1.73
60	2.00
80	2.94
100	2.97

$Ba(ClO_3)_2$ (80, 503)

t, °C	M
· Aq	
0	0.65
10	0.88
20	1.11
30	1.37
40	1.64
60	2.20
80	2.79
100	3.48
105	3.67

$Ba(ClO_4)_2$ (80)

0	6.4
↓ 20	8.5
100	17.0

$BaBr_2$ (144, 278, 330)

t, °C	M ± 5%
S · 2Aq	
−20	2.8
0	3.1
+20	3.4
25	3.52
40	3.7
60	4.0
80	4.3
100	4.6

$Ba(BrO_3)_2$ (206, 503)

t, °C	M ± 0.5%
S · Aq	
0	0.00730
10	0.01121
20	0.01668
25	0.02018
30	0.02441
40	0.03375
50	0.0445
60	0.0590
70	0.0763
80	0.0928
90	0.1129
100	0.148

BaI_2 (144, 279, 330)

t, °C	M ± 3%
S · 6Aq	
−10	3.90
0	4.33
+10	4.77
20	5.20
30	5.64
S · 6Aq + S · 2Aq	
40U	6.06
S · 2Aq	
↓ 50	6.20
100	6.93

[*Cf.* however the recent determinations by (537).]

$Ba(IO_3)_2$ (211*, 503)

t, °C	M
S · Aq	
0	0.000164
10	0.000285
20	0.000450
25	0.000540

$Ba(IO_3)_2$.—(*Continued*)

t, °C	M
S · Aq	
30	0.000635
40	0.00084
50	0.00115
60	0.00149
70	0.00190
80	0.00236
90	0.00290

* At 25° gives M = 0.000792.

$BaSO_3$ (428)

20	0.00091

BaS_2O_6 (11)

t, °C	M ± 1%
S · 2Aq	
0	0.286
10	0.443
20	0.629
30	0.833

$Ba(SH)_2$ (488)

t, °C	M
S · 4Aq	
−20	2.30
0	2.38
+20	2.45
40	2.59
60	2.79
80	3.15
100	3.81

$BaSeO_4$ (325)

S	
25	0.000288

$Ba(NO_2)_2$ (379)

t, °C	M ± 3%
S · Aq	
−10	2.27
0	2.39
+10	2.59
20	2.93
30	3.49
40	4.22
50	5.10
60	6.06
70	7.13
80	8.7
90	10.6
100	13.9
110	19.8

$Ba(NO_3)_2$ (104, 106, 144, 145, 155, 201, 312, 363, 382)

t, °C	M ± 2%
S	
0	0.190
10	0.262
20	0.359
30	0.445
40	0.550
50	0.660
↓ 60	0.780
100	1.32

$BaCO_3$ (*v.* Vol. III, p. 377)

$BaC_3H_2O_4$ (328)
Malonate

t, °C	M
S · 2Aq(?)	
0	0.0059
10	0.0074
20	0.0088
30	0.0101
40	0.0111
50	0.0120
60	0.0128
70	0.0132

$BaC_4H_4O_4$ (328)
Isosuccinate

S	
0	0.076
10	0.112
20	0.142
30	0.164
40	0.179
50	0.185
60	0.184
70	0.174

$BaC_4H_4O_4$ (328, 384)
Succinate

S	
0	0.0168
10	0.0170
15*	0.0159
20	0.0164
30	0.0156
40	0.0145
50	0.0133
70	0.0108
100*	0.0081

* (484).

$BaC_4H_4O_5$ (78, 132, 384)
l-Malate

S		
0	*	0.029
20	*	0.032
40	*	0.035
60	*	0.038
80	*	0.040
0	†	0.038
20	†	0.046
40	†	0.053

* (78). † (132, 384).

$BaC_4H_4O_6$ (79, 132)
Tartrate

S · 0.5Aq(?)	
0	0.00070
10	0.00084
20	0.00096
30	0.00110
40	0.00124
60	0.00154
80	0.00188

$BaC_4H_4O_6$ (132)
Racemate

S	
0	0.00085
10	0.00096
20	0.00108
30	0.00120
40	0.00131

$Ba(CH_3CO_2)_2$ (267, 516)
Acetate

t, °C	M ± 1%
S · 3Aq	
0	2.27
10	2.50
20	2.79
25m	3.02
S · 3Aq + S · Aq	
23U	2.90
S · Aq	
30	2.94
35	2.98
40	3.05
S · Aq + S	
42U	3.08
S	
45	3.05
50	3.01
60	2.94
70	2.89
80	2.88
90	2.90
100	2.94

$Ba(C_2H_5CO_2)_2$ (267, 525)
Propionate

t, °C	M
0	2.02
10	1.98
20	1.97
30	2.01
40	2.05
50	2.12
60	2.19
70	2.28
80	2.41
90	2.58
100	2.85

$Ba(C_3H_7CO_2)_2$ (121)
Butyrate
S · 2Aq(?)

0	1.20
10	1.18
20	1.16
30	1.15
40	1.15
50	1.17
60	1.21
70	1.27

$Ba(C_5H_9O_2)_2$ (286)
Trimethylacetate
S · 5Aq

0	1.01
20	0.97
40	0.94

$Ba(C_4H_9CO_2)_2$ (176)
n-Valerate

0	0.64
10	0.61
20	0.59
30	0.58
40	0.58
50	0.59
60	0.61
70	0.64

$Ba(C_6H_5CO_2)_2$ (484)
Benzoate

t, °C	M
15	0.118
100	0.295

$Ba(C_6H_5CH:CHCO_2)_2$ (484)
Cinnamate

15	0.0167
100	0.054

$BaC_3H_4O_5S$ (170)
dl-Sulfopropionate

24.6	0.246

$Ba[C_6H_2(NO_2)_3O]_2$ (156)
Picrate
S · 5Aq

25	0.0212

$Ba[C_6H_2(NO_2)_2OHCO_2]_2$ (156)
Dinitrosalicylate
S

25	0.0107

$BaC_{10}H_5NH_2(SO_3)_2$
Naphthylaminedisulfonates
v. p. 219

$BaCl_2.CdCl_2$ (421)

t, ° C	M ± 3%
S · 4Aq	
20	1.80
40	2.22
60	2.75
80	3.42
100	4.28

$BaCl_2.2CdCl_2$ (421)
S · 5Aq

20	1.43
40	1.66
60	1.93
80	2.28
100	2.68

$RaSO_4$ (297)

t, °C	M
25	6.5×10^{-8}

LiOH (128, 393, 449)

t, °C	M ± 3%
S · Aq	
10	5.30
20	5.32
30	5.36
40	5.42
50	5.53
60	5.72
70	6.00
80	6.38

LiF (357)

t, °C	M
18	0.104

LiCl (47, 48, 139, 222, 278, 279, 396, 397)

t, °C	M ± 5%
S · 2Aq	
0	15.3
10	17.3
S · 2Aq + S · Aq	
12.5U	17.8

LiCl.—(*Continued*)

t, °C	M ± 5%
S · Aq	
20	18.8
40	21.2
60	24.0
80	27.1
S · Aq + S	
98U	30.7
S	
100	30.8
120	31.7
140	32.8
160	34.2

$LiClO_3$ (267.5)

t, °C	Wt. % H_2O
S_I	
127.6	0.0
120.3	1.44
115.3	2.46
107.7	3.68
103.4	4.44
100.2	4.91
$S_I + S_{II}$	
99	5.1
S_{II}	
95.7	5.65
92.3	6.32
85.8	7.46
78.9	8.61
71.3	9.72
67.2	10.57
48.3	12.83
36.9m	13.73
$S_{II} + S_{III}$	
42	13.4
S_{III}	
43.9m	12.83
39.6	13.73
36.8	14.64
32.0	16.09
27.2	17.33
22.1	18.32
12.8m	20.74
+2.9m	22.41
−3.2m	23.41
S_{III} + S · Aq	
21.5	18.8
S · Aq	
20.5	19.73
18.9	21.46
16.7	22.75
14.1	23.41
12.0	25.03
9.1	26.26
6.8	27.20
5.1	27.61
3.8	28.11
0.9	28.82
S · Aq + S · 3Aq	
+ 1.5E	28.9
S · 3Aq	
−13.6m	22.75
− 7.8m	24.55
− 7.3m	25.03
− 5.8m	25.37

$LiClO_3$.—(*Continued*)

t, °C	Wt. % H_2O
S · 3Aq	
0.0m	28.11
+ 3.4	30.26
4.5	31.61
6.0	32.82
6.8	33.89
7.4	35.12
7.9	36.56
8.0	37.4
7.85	38.49
7.3	39.85
6.1	41.84
4.8	43.34
2.2	45.43
+ 0.5	46.73
− 1.8	48.05
− 4.8	49.51
− 7.3	51.04
− 8.8	52.06
−15.7	54.65
−33.9	60.95
−37.1	61.9
−39.0	62.58
S · 3Aq + Ice	
−40E	63.0
S_{II} + S · 3Aq	
−25mE	19
S_{III} + S · 3Aq	
− 9mE	24.3

LiBr (47, 48, 279)

t, °C	M ± 10%
S · 2Aq	
20	20
S · 2Aq + S · Aq	
44U	24
S · Aq	
60	25.5
80	27.5
100	30.5

$LiBrO_3$ (357)

t, °C	M
S	
18	11.4

LiI (47, 48, 279)
S · 3Aq

0	11.0±10%
20	12.0±10%
40	13.0±10%
60	14.5±10%

$LiIO_3$ (357)
S

18	4.42

Li_2SO_4 (144, 276, 311, 450, 452, 453)
S · Aq(?)

−20	2.05
−15	2.72
−10	3.02
0	3.18
+10	3.16
20	3.12
100	2.64

Li_2SeO_3 (431)

t, °C	M ± 3%
S · 0.75Aq	
0	1.77
20	1.51
40	1.26
60	1.06
80	0.87
100	0.70

$LiNO_2$ (379)

t, °C	x
S · Aq	
−40	0.110
−20	0.148
0	0.196
+20	0.245
40	0.302
S · Aq + S · 0.5Aq	
49U	0.345
S · 0.5Aq	
60	0.363
70	0.388
80	0.420
90	0.475
95	0.568
96.5	0.667
95	0.785

$LiNO_3$ (130, 278, 311)

t, °C	M ± 3%
S · 3Aq	
0	7.3
10	8.4
20	10.5
25	12.4
29	16.0
29.88	18.5
S · 3Aq + S · 0.5Aq	
29.6E	20.0
S · 0.5Aq	
30	20.1
40	21.5
50	23.3
60	25.6
S · 0.5Aq + S	
61U	26.0
S	
70	27.6
80	29.6
90	31.6
100	33.9
110	36.5

Li_3SbS_4 (127)

t, °C	M
S · 10Aq	
−40	2.50
−20	2.83
0	3.14
+20	3.47
50	3.95

Li_2CO_3 (38, 84, 179, 278, 432, 436)

t, °C	M ± 3%
S(?)	
0	0.208
10	0.193

Li_2CO_3.—(*Continued*)

t, °C	M ± 3%
S(?)	
20	0.180
25	0.1723*
100	0.090

* ±0.5 %.

$Li_2C_2O_4$ (165)
Oxalate

t, °C	M
S	
25	0.61

$LiHCO_2$ (194)
Formate

t, °C	M ± 2%
S · Aq	
−20	5.20
0	6.20
+20	7.60
40	9.5
60	12.4
80	17.6
90	22.0
S · Aq + S	
94U	25.1
S	
100	25.7
120	28.3

$LiHCO_3$ (38)

t, °C	M
13	0.81

$LiCH_3CO_2$ (464)
Acetate

S · 2Aq	
0	4.69
10	5.11
20	5.77
30	7.77
40	10.4
50	14.6
55	18.7
57.8	27.8
S · 2Aq + S	
57.8EU	29.1
S	
60	29.1
80	29.3
100	30.1
150	36.1
200	56.4
250	142.6
286	∞

$Li_2C_4H_4O_8$ (152)
Dihydroxytartrate

0	0.0041

$LiC_6H_5CO_2$ (463)
Benzoate

t, °C	M ± 2%
S · Aq	
0	3.03
10	3.26
20	3.49
30	3.76
S · Aq + S	
34U?	3.88

$LiC_6H_5CO_2$.—(*Continued*)

t, °C	M ± 2%
S	
40	3.90
80	4.10
120	4.66
160	6.12
176	7.54

$LiC_7H_5O_3$ (463)
o-Hydroxybenzoate

S · 6Aq	
−10	5.62
− 5	6.12
0	6.84
+ 3.5m	7.80
S · 6Aq + S · Aq	
1U	7.02
S · Aq	
10	7.74
20	8.82
30	10.22
40	11.82
50	13.60
S · Aq + S	
51U	13.80
S	
50m	13.66
60	14.48
80	16.16
100	18.04
120	20.42
138	24.10

$LiC_7H_5O_3$ (463)
m-Hydroxybenzoate

S	
10	8.65
20	8.71
40	8.90
60	9.20
80	9.77
100	10.71
120	12.40

$LiC_7H_5O_3$ (463)
p-Hydroxybenzoate

S	
0	3.10
20	3.10
40	3.11
60	3.16
80	3.24
100	3.45
115	3.82

Li_2SnO_3 (535)

t, °C	M
S · 5Aq	
30	0.116
40	0.127
50	0.139
60	0.152
70	0.164
80	0.178
S · 3Aq	
30m	0.186
40m	0.192
50m	0.202
60m	0.216

Li_2SnO_3.—(*Continued*)

t, °C	M
S · 3Aq	
70m	0.235
80m	0.262

$LiAuCl_4$ (429)

S · 4Aq(?)*	
10	3.28
20	3.92
30	4.80
40	5.96
50	7.42
60	9.36
70	12.3

* M. P. would be 73°, M = 13.9

$Li_2Pt(CN)_6$ (491)

?	
0	3.35
S · 5Aq	
15	4.44
20	4.50
25	4.62
30m	4.91
40m	5.74
45m	6.29
S · 5Aq + S · x_1Aq	
29U	4.85
S · x_1Aq	
25m	4.85
30	4.85
35	4.94
40m	5.12
S · x_1Aq + S · x_2Aq	
39U	5.08
S · x_2Aq	
40	5.10
50m	5.56
52.5m	5.78
S · x_2Aq + S · x_3Aq	
49.5U	5.52
S · x_3Aq	
55	5.56
60	5.68
65	5.96
S · x_3Aq + S · x_4Aq	
69U	6.52
S · x_4Aq	
70	6.55
80	6.84
90	7.68

Transition pts.: Dilatometric, 26°, 38°, 46°, 69°. Curve, 29°, 39°, 49.5°, 69°.

Li_2CrO_4 (357, 449)

S · 2Aq	
18	8.5
30	7.7

$Li_2Cr_2O_7$ (449)

30	5.67

Li_2MoO_4 (432)

t, °C	M ± 3%
S · 0.75Aq	
0	4.74
20	4.63
100	4.24

Li_3VO_4 (432)

t, °C	M
S · 9Aq	
0	0.181
10	0.250
20	0.338
30	0.441
S · 9Aq + S · Aq	
31.5U	0.46
S · Aq	
35	0.41
40	0.35
50	0.24
55	0.20

$LiBO_2$ (288, 432)

t, °C	M ± 4%
S · 8Aq	
0	0.164
10	0.284
20	0.49
30	0.98
40	2.32
44	3.36
46	4.66
47.1	6.94
46	8.6
42	10.4

NaOH (133, 168, 171, 191, 359, 393, 449, 454) (*See* Fig. 17)

t, °C	M
S · 7Aq	
−28	5.90
−26	6.38
−24m	7.22
−23.5m	7.93
−24m	8.74
−26m	9.80
S · 5Aq	
−30m	6.30
−25m	6.96
−20	7.78
−15m	8.94
−13m	9.74
−12.3m	11.10
−13m	11.80
S · 4Aq(α)	
−20m	8.00
−15	8.40
−10	8.90
− 5	9.56
0	10.50
+ 5m	11.86
7.8m	13.88
6m	15.90
S · 4Aq(β)	
−10m	10.54
− 8m	11.04
− 6m	11.60
− 4m	12.22
− 2m	13.16
− 1.4m	13.88
0m	14.60
S · 3.5Aq	
−10m	10.30
− 5m	10.56

NaOH.—(*Continued*)

t, °C	M
S · 3.5Aq	
0m	10.98
+ 5	11.64
10	12.80
15	14.76
15.8	15.84
15	17.50
10	20.06
5m	21.42
S · 3Aq	
− 2m	14.86
0m	15.78
+ 2m	17.00
2.8m	18.50
2m	19.14
1m	19.54
S · 2Aq	
0m	18.66
2m	19.48
4m	20.38
6	21.30
8	22.40
10	23.74
12	25.66
12.8m	27.75
S · Aq	
0m	24.2
5m	24.8
10m	25.5
15	26.3
20	27.2
25	28.3
30	29.6
35	31.0
40	32.2
45	34.1
50	36.2
55	39.4
60	44.0
64	51.6
64.5	55.5
64	61.0
62	68.6
S	
60	73.0
80	78.5
100	84.7
120	91
140	98
160	106
180	116
190	124
S · 7Aq + S · 5Aq	
−24.3U	7.0
S · 5Aq + S · 4Aq(α)	
−18.0U	8.2
S · 4Aq(α) + S · 3.5Aq	
3.6U	11.4
S · 4Aq(β) + S · 3.5Aq	
−11.0mU	10.3
S · 4Aq(β) + S · 3Aq	
− 2.3mE	14.8

NaOH.—(*Continued*)

t, °C	M
S · 3.5Aq + S · 2Aq	
+ 5.9E	21.2
S · 3Aq + S · 2Aq	
1.6mE	19.3
S · 2Aq + S · Aq	
12.2U	25.5
S · Aq + S	
60E	72.9

NaF (63, 87, 125, 172, 357)

t, °C	M ± 3%
S	
15	1.00
25	1.00
100	1.02

NaCl (5, 8, 36, 43, 44, 45, 46, 63, 90, 97, 105, 106, 144, 149, 171, 199, 202, 222, 224, 233, 312, 326, 338, 339, 374, 405, 424, 426, 441, 447, 454, 465, 482, 485, 495, 500, 501); *cf.* (540)

t, °C	M ± 0.2%
S · 2Aq + Ice	
−21.1E	5.20
S · 2Aq	
−20	5.28
−15	5.48
−10	5.69
− 5	5.90
S · 2Aq + S	
+ 0.15U	6.10
S	
0m	6.10
5	6.10
10	6.11
15	6.12
20	6.13
25	6.145
30	6.165
35	6.18
40	6.215
45	6.24
50	6.26
55	6.29
t, °C	M ± 0.5%
60	6.33
65	6.37
70	6.41
75	6.45
80	6.50
85	6.55
90	6.60
95	6.65
100	6.70
110	6.81
120*	6.93
130	7.06
140	7.19
150	7.32
160	7.45
170	7.58
180	7.71

* Accuracy unknown at 120° and higher.

$NaClO_3$ (63, 80, 192, 277, 287, 374)

t, °C	M ± 3%
S	
0	7.5
20	9.2
40	11.1
60	13.4
80	16.1
100	19.4
t, °C	M* ± 2%
20	6.78
30	7.23
40	7.70
50	8.14
60	8.58
70	9.02
80	9.41
90	9.69
100	10.43

* Per 1 soln.

$NaClO_4$ (80)

t, °C	M
S · Aq	
15	14.9
50	20.2
S	
140	30.6

NaBr (63, 90, 105, 200, 277); *cf.* (540)

t, °C	M ± 2%
S · 2Aq	
−20	6.98
−10	7.32
0	7.71
+10	8.17
20	8.77
30	9.46
40	10.31
S · 2Aq + S	
50U	11.29
S	
60	11.38
80	11.60
100	11.84
120	12.13

$NaBrO_3$ (277)

t, °C	M
S	
0 ↓	1.82
60	4.14
80	5.04

NaI (63, 90, 105, 200, 277); *cf.* (540)

t, °C	M ± 2%
S · 2Aq	
−15	9.95
−10	10.20
0	10.72
+10	11.31
20	11.98
30	12.75
40	13.75
50	15.13
60	17.18

NaI.—(*Continued*)

t, °C	M ± 2%
S · 2Aq + S	
68.9U	19.59
S	
70	19.60
80	19.80
90	20.00
100	20.24

$NaIO_3$ (277, 316)

t, °C	M ± 10%
S · 1.5Aq	
↓ 0	0.142
50	0.882
60	1.046
80	1.402

Na_2S (381)

t, °C	M ± 3%
S · 9Aq	
10	1.98
20	2.34
30	2.91
40	3.63
50	4.03
S · 9Aq + S · 6Aq	
52U	4.70
S · 9Aq + S · 5.5Aq	
58mU	5.32
S · 6Aq	
50m	4.67
60	5.01
70	5.56
80	6.30
90	7.34
S · 5.5Aq	
50m	5.12
60m	5.40
70m	5.90
80m	6.59
90m	7.59

Na_2SO_3 (158, 213)

t, °C	M ± 1%
S · 7Aq	
0	1.09
10	1.52
20	2.08
30	2.80
S · 7Aq + S	
33.4U	3.09
S	
40	2.95
50	2.76
60	2.59
70	2.43
80	2.30
90	2.20
100	2.14

Na_2SO_4 (36, 43, 44, 45, 63, 106, 144, 164, 200, 222, 302, 311, 378, 385, 409, 415, 418, 424, 447, 454, 456, 483, 495)

(*See* Fig. 18)

t, °C	M ± 1%
S · 10Aq	
0	0.342
5	0.428
10	0.628
15	0.920
20	1.33
25	1.96
30	2.88
S · 10Aq + S	
32.48U	3.50
S	
35	3.45
40	3.40
50	3.28
60	3.19
70	3.11
80	3.05
90	3.00
100*	2.97
110	2.96
120	2.95
130	2.95
140	2.96
160	3.01
180	3.09
200	3.18
220	3.26
240	3.36
S · 7Aq	
0m	1.34
10m	2.14
20m	2.94
S · 7Aq + S	
28.2mU	3.59
S · 7Aq + S · 10Aq	
34.4mU	4.08

* Above 100° accuracy is unknown. According to (418) $\log M = (-0.49050 + 0.0296389t + 0.0000688925t^2) \pm 0.03\%$. t = Hydrogen temp. scale. Weights *in vacuo*.

$Na_2S_2O_3$ (274, 486, 533, 534)

(*See* Fig. 19)

t, °C	M
S · 6Aq	
0m	5.41
5m	5.94
10m	6.75
13m	7.72
S · 5Aq(α)	
0	3.20
10	3.77
20	4.43
30	5.24
40	6.50
45	7.70
S · 5Aq(β)	
0m	4.57
10m	5.20
20m	6.14
30m	8.22
S · 4Aq	
31.5mU	8.50
35m	9.30
38m	10.40
40m	11.4
S · 2Aq(α)	
0m	7.10
10m	7.37
20m	7.78
30m	8.40
40m	9.20
50	10.39
60	12.14
65	13.45
S · 2Aq(β)	
0m	8.60
10m	9.08
20m	9.90
30m	11.13
35m	11.88
S · ³⁄₂Aq	
0m	8.53
10m	8.83
20m	9.24
30m	9.79
40m	10.58
47.5m	11.58
S · ⁴⁄₃Aq	
0m	8.60
10m	8.92
20m	9.31
30m	9.90
40m	10.77
50m	12.00
55m	12.88
S · Aq(α)	
0m	9.68
10m	9.91
20m	10.36
30m	11.02
40m	11.81
50m	12.77
55m	13.37
S · Aq(β)	
47.5m	11.63
50m	11.90
55m	12.54
60m	13.48
S · Aq(γ)	
30m	10.93
40m	11.62
50m	12.60
55m	13.18
S · ½Aq	
30m	11.47
40m	11.77
50m	12.28
60m	13.07
70U	14.10
S	
40m	13.06
50m	13.38
60m	13.72
70	14.12
80	14.60
S · 5Aq(β) + S · 4Aq	
30.2mU	8.3
S · 4Aq + S · 2Aq(α)	
31.5mU	8.5
S · 5Aq(β) + S · 2Aq(α)	
30.5mU	8.4
S · 5Aq(α) + S · 2Aq(α)	
48.2U	10.1
S · 4Aq + S · Aq(α)	
40.7mU	11.9
S · 5Aq(α)	
48.5m	
S · 4Aq	
41.7m	
S · 6Aq	
14.4m	

Distinction between Aq(α) and Aq(β) and between ³⁄₂Aq and ⁴⁄₃Aq, doubtful.

$Na_2S_2O_4$ (251)

t, °C	M ± 5%
20	1.26

$Na_2S_2O_5$ (158); Pyrosulfite

t, °C	M ± 1%
S · 7Aq	
−10	1.59
− 8	1.69
− 6	1.81
− 2	2.16
0	2.38
+ 2	2.63
S · 6Aq	
−10m	1.64
− 8m	1.76
− 6m	1.90
− 4m	2.09
− 2m	2.31
0m	2.58
+ 2m	2.90
S · 6Aq + S	
4.0U(m?)	3.02
S	
0m	3.18
20	3.41
40	3.75
60	4.18
80	4.65
100	5.17

$Na_2S_2O_6$ (11)

t, °C	M ± 5%
S · 2Aq	
0	0.31
10	0.53
20	0.76
30	1.01

Na_2SeO_4 (175)

t, °C	M ± 3%
S · 10Aq	
0	0.70
10	1.34
15	1.77
20	2.30
25	3.04
30	4.16
S · 10Aq + S	
31U	4 47

Na_2SeO_4.—(*Continued*)

t, °C	M ± 3%
S	
40	4.35
60	4.10
80	3.93
100	3.86

$NaNO_2$ [379]

S	
−10	9.86
0	10.48
+20	11.98
40	13.86
60	16.50
80	19.68
100	23.5
120	29.1
130	32.4

$NaNO_3$ [36, 46, 63, 104, 106, 151, 186, 200, 247, 274, 311, 363, 426, 447, 485]

t, °C	M ± 2%
S	
−17.5	7.4
−10	7.90
0	8.62
+10	9.43
20	10.31
25	10.80
30	11.31
40	12.39
50	13.50
60	14.70
70	16.02
80	17.42
90	18.96
100	20.64
110	22.56
120	24.80

$NaNH_4SO_4$ [114]

t, °C	M
S · 2Aq	
25	4.62
35	5.22

Na_3PO_4 [111, 399, 410, 448]

t, °C	M ± 5%
S · 12Aq	
0	0.095
10	0.28
20	0.68
40	1.84
60	3.33
70	4.13
S · 12Aq + S · *x*Aq	
73.4*	
S · *x*Aq	
75	4.54
80	4.96
100	6.67

* This transition found by [410] is not given on curve of [399].

$Na_4P_2O_7$ [399]

S · 10Aq	
0	0.118
10	0.150

$Na_4P_2O_7$.—(*Continued*)

t, °C	M ± 5%
S · 10Aq	
20	0.240
40	0.500
60	0.806
80	1.146
100	1.514

NaH_2PO_4 [111, 242]

t, °C	M ± 0.5%
S · 2Aq	
0	4.82
5	5.11
10	5.82
15	6.39
20	7.07
25	7.89
30	8.85
35	10.03
40	11.52
S · 2Aq + S · Aq	
40.8U	11.85
S · Aq	
45	12.39
50	13.23
55	14.24
S · Aq + S	
57.4U	14.72
S	
60	14.94
70	15.87
80	17.23
90	18.80
100	20.74

Na_2HPO_4 [30, 111, 204, 321, 374, 447, 462, 494]

t, °C	M ± 2%
S · 12Aq(β)	
0	0.116
5	0.174
10	0.254
15	0.336
20	0.550
25	0.86
S · 12Aq(β) + S · 12Aq (α)	
29.8U	1.67
S · 12Aq(α)	
30	1.69
32	1.94
34	2.44
S · 12Aq(α) + S · 7Aq	
35.1U	3.00
S · 7Aq	
36	3.16
40	3.81
44	4.60
48	5.59
S · 7Aq + S · 2Aq	
48.1U	5.64
S · 2Aq	
50	5.66
60	5.82
70	6.16
80	6.61
90	7.24

Na_2HPO_4.—(*Continued*)

t, °C	M ± 2%
S · 2Aq + S	
95U	7.60
S	
97.5	7.35
100	7.10

Na_3AsO_4 [448]

t, °C	M
14	0.56

Na_2HAsO_4 [448, 494]

S · 12Aq	
0	0.39 ± 5%
5	0.55 ± 5%
10	0.79 ± 5%
15	1.15 ± 5%
20	1.77 ± 5%
28	4.63 ± 5%

NaH_2SbO_4 [499]

S · 2Aq	
20	0.00248
25	0.00299
30	0.00360
35	0.00443

Na_3SbS_4 [127]

S · 9Aq	
0	0.419
10	0.640
20	0.884
30	1.18
40	1.55
50	2.00
60	2.56
70	3.25
80	4.24

Na_2CO_3 [45, 90, 106, 143, 171, 201, 256, 300, 307, 338, 339, 375, 447, 519] (*See* Fig. 20)

S · 10Aq	
0	0.66
5	0.84
10	1.14
15	1.55
20	2.09
25	2.77
28	3.27
30	3.70
S · 10Aq + S · 7Aq(β)	
32.00U	4.29
S · 10Aq + S · Aq	
32.96mU	4.72
S · 7Aq(β)	
0m	1.92
10m	2.48
20m	3.16
30m	4.07
32	4.29
34	4.51
36m	4.77
S · 7Aq(β) + S · Aq	
35.37U	4.69
S · 7Aq(α)	
0m	3.01
5m	3.28
10m	3.58

Na_2CO_3.—(*Continued*)

t, °C	M
S · 7Aq(α)	
15m	3.91
20m	4.32
S · Aq	
30m	4.77
40	4.61
50	4.48
60	4.38
80	4.28
100	4.26

$Na_2C_2O_4$ [102, 103, 165, 400, 473]; Oxalate

S	
15	0.237 ± 3%
↓ 100	0.472 ± 3%

$NaHCO_2$ [194]
Formate

t, °C	M ± 2%
S · 3Aq	
−20	4.34
−10	5.10
0	6.44
+ 5	7.50
10	8.90
15	10.71
18m	11.99
S · 3Aq + S · 2Aq	
17.0U	11.6
S · 2Aq	
18	11.88
20	12.52
23	13.68
26m	15.3
S · Aq + S	
24.8U	14.5
S	
20m	14.3
30	15.1
60	17.8
80	20.1
100	23.5
120	27.9

$NaHCO_3$ [122, 149, 151, 171, 307, 500, 501]

t, °C	M ± 1%
S	
0	0.82
15	1.05
25	1.22
30	1.31
35	1.41
45	1.62
60	1.96

$NaCH_3CO_2$ [193, 222, 445]
Acetate

t, °C	M
S · 3Aq	
0	4.56
10	4.98
20	5.60
30	6.54
40	7.92

$NaCH_3CO_2$.—(*Continued*)

t, °C	M
S · 3Aq	
50	10.20
55	12.20
58m	18.50
S · 3Aq + S	
58U	16.80
S	
0m	14.51
20m	15.11
40m	15.87
60	17.02
80	18.63
100	20.75
120	23.17

$Na_2C_4H_4O_8$ (152)
Dihydroxytartrate

0	0.00173

$NaC_6H_5CO_2$ (463)
Benzoate

S	
0	4.36
50	4.40
75	4.68
100	5.15
125	5.92
150	7.08
175	8.50
200	10.20

$NaC_6H_4OHCO_2$ (463)
o-Hydroxybenzoate

t, °C	M ± 3 %
S · 6Aq	
0	1.69
5	2.15
10	2.82
15	3.96
S · 6Aq + S	
20.0U	6.45
S	
30	6.88
50	7.75
70	8.68
90	9.72
100	10.30
120	11.65
130	12.50

$NaC_6H_4OHCO_2$ (463)
m-Hydroxybenzoate

S	
10	8.88
20	9.03
30	9.21
50	9.69
75	10.5
100	11.62
125	12.97
150	14.53

$NaC_6H_4OHCO_2$ (463)
p-Hydroxybenzoate

t, °C	M ± 4%
S · 5Aq	
0	1.10

$NaC_6H_4OHCO_2$.—(*Continued*)

t, °C	M ± 4%
S · 5Aq	
10	1.75
20	2.50
30	3.47
S · 5Aq + S	
38U	4.8
S	
50	5.10
150	7.30

$NaC_6H_4NO_2O$ (156, 189)
p-Nitrophenate

t, °C	M ± 0.5%
S · 4Aq	
20	3.00
25	3.67
30	4.40
S · 4Aq + S · 2Aq	
35.4U	5.38
S · 2Aq	
40	6.10
45	6.93
50	7.88

$NaC_6H_3(NO_2)_2O$ (156)
3, 4-Dinitrophenate

t, °C	M
S · Aq	
25	0.219

$NaC_6H_2(NO_2)_3O$ (156)
Picrate

t, °C	M
S · Aq	
0	0.073
25	0.173

$NaC_6H_3ClNO_2O$ (156)
3, 4-Chloronitrophenate

S · Aq	
25	0.139

$NaHC_{10}H_5NH_2(SO_3)_2$
$Na_2C_{10}H_5NH_2(SO_3)_2$
Naphthylaminedisulfonates
v. p. 219

$NaClNO_2C_6H_2CH_3SO_3$ (113)
Chloronitro-*m*-toluenesulfonate

t, °C	M ± 4%
0	0.380
10	0.426
15	0.470
20	0.533
25	0.618
30	0.740

Na_2ZrF_6 (308)

t, °C	M
18	0.0151
100	0.0665

Na_2SnO_3 (535)

S · 4Aq	
− 5	2.53
0	2.60
+10	2.74
20	2.89
30	3.08

Na_2SnO_3.—(*Continued*)

t, °C	M
S · 4Aq	
40	3.30
50	3.62
S · 3Aq + S · 4Aq	
− 9U	2.47
S · 3Aq	
− 5	2.46
0	2.44
+10	2.40
20	2.32
30	2.21
40	2.05
45	1.91

$Na_2SO_4.ZnSO_4$ (266)

t, °C	M ± 1%
S · 4Aq	
25	1.637
30	1.641
35	1.646
40	1.654

$Na_2SO_4.CdSO_4$ (266)

S · 4Aq	
25	1.72
30	1.74
35	1.77
40	1.79

$Na_2SO_4.CuSO_4$ (266, 311)

S · 2Aq	
20	1.24
25	1.22
30	1.20
35	1.18
40	1.17

$NaAuCl_4$ (429)

t, °C	M ± 3%
S · 2Aq	
10	3.95
20	4.18
30	4.91
40	6.26
50	9.52
60	24.9

$Na_2SO_4.FeSO_4$ (266)

t, °C	M ± 1%
S · 4Aq	
20	1.59
25	1.55
30	1.53
35	1.55
40	1.59

$Na_4Fe(CN)_6$ (210)

t, °C	M ± 0.2%
25	0.682

$Na_2SO_4.CoSO_4$ (266)

t, °C	M ± 1%
S · 4Aq	
20	1.73
25	1.62
30	1.52
35	1.44
40	1.39

$Na_2SO_4.NiSO_4$ (266)

S · 4Aq	
20	1.89

$Na_2SO_4.NiSO_4$.—(*Continued*)

t, °C	M ± 1%
S · 4Aq	
25	1.74
30	1.60
35	1.49
40	1.43

Na_2CrO_4 (357, 358, 378, 412, 440, 449, 483)

t, °C	M ± 2%
S · 10Aq	
0	1.96
5	2.50
10	3.10
15	3.80
20m	5.00
21m	5.56
S · 6Aq + S · 10Aq	
19.6U	4.88
S · 10Aq + S · 4Aq	
20.1mU	5.05
S · 6Aq	
18m	4.80
20	4.91
22	5.02
24	5.13
S · 4Aq	
20m	5.04
30	5.39
40	5.92
50	6.48
60	7.14
S · 4Aq + S	
64.8U	7.58
S	
70	7.61
80	7.68
90	7.74
100	7.80
S · 6Aq + S · 4Aq	
26.0U	5.24

$Na_2Cr_2O_7$ (358, 449)

t, °C	M ± 2%
S · 2Aq	
0	6.22
10	6.50
20	6.90
30	7.51
40	8.40
60	10.64
80	14.76
S · 2Aq + S	
84U	16.40
S	
90	16.44
100	16.60

$Na_2Cr_3O_{10}$ (358)

t, °C	M ± 3%
S · Aq	
0	11.1
20	11.5
40	12.3
60	13.5
80	15.0
100	16.8

$Na_2Cr_4O_{13}$ (358)

t, °C	M ± 3%
S · 4Aq	
0	5.84
10	5.97
15	6.16
22	6.86

Na_4CrO_5 (358)

S · 13Aq	
0	2.19
10	2.47
20	2.71
25	2.88
30	3.12
37	3.68

Na_2MoO_4 (175)

S · 10Aq	
0	2.14
2	2.30
4	2.48
6	2.68
8	2.88
10	3.10
S · 10Aq + S · 2Aq	
10.4U	3.14
S · 2Aq	
20	3.16
40	3.28
60	3.50
80	3.76
100	4.06

Na_2WO_4 (175)

t, °C	M ± 2%
S · 10Aq	
− 4	1.60
− 2	1.79
0	1.96
S · 10Aq + S · 2Aq	
+ 6U	2.44
S · 2Aq	
0m	2.43
10	2.45
20	2.49
40	2.63
60	2.83
80	3.06
100	3.32

$Na_2B_4O_7$ (239, 374, 441)

S · 10Aq	
0	0.055
10	0.081
20	0.129
30	0.199
40	0.312
45	0.400
50	0.524
55	0.706
60	0.964
S · 10Aq + S · 5Aq	
61U	1.018
S · 5Aq	
65	1.088
70	1.212
75	1.36

$Na_2B_4O_7$.—(*Continued*)

t, °C	M ± 2%
S · 5Aq	
80	1.56
90	2.03
100	2.60

$NaAl(SO_4)_2$ (466)

t, °C	M ± 0.5%
S · 12Aq	
10	1.516
15	1.599
20	1.688
25	1.783
30	1.892

$Na_2SO_4.MgSO_4$ (16)

t, °C	M ± 2%
S · 4Aq	
25	1.97
30	2.00
35	2.07
47	2.00

KOH (133, 153, 167, 393, 449, 513)

t, °C	M ± 2%
S · 4Aq	
−45	10.2
−40	11.0
−35	12.2
−32.8	13.9
S · 4Aq + S · 2Aq	
−33.0E	14.44
S · 2Aq*	
−20	15.4
0	17.3
+10	18.4
20	19.9
30	22.5
S · 2Aq + S · Aq	
33U	24.00
S · Aq	
40	24.4
60	26.0
80	28.4
100	31.6
120	36.2
140	45.6

* The values of (167, 449) at 15° and 25° are 5–10 % lower.

KF (125, 357)

t, °C	M
S · 2Aq	
18	15.9
21	16.6

KCl (4, 5, 8, 22, 36, 43, 45, 46, 63, 70, 105, 106, 139, 173, 200, 222, 224, 233, 324, 373, 426, 447, 481, 495, 502, 513); *cf.* (540)

t, °C	M ± 0.5%
S	
−10	3.33
0	3.76
+10	4.19
20	4.61
25	4.81
30	5.01

KCl.—(*Continued*)

t, °C	M ± 0.5%
S	
40	5.40
60	6.15
80	6.83
100	7.51
t, °C	M ± 5%
120	8.2
140	8.9
160	9.6
180	10.3

$KClO_3$ (19, 63, 76, 80, 84, 144, 181, 199, 363, 485, 495, 498)

t, °C	M ± 3%
S	
0	0.270
10	0.400
20	0.582
30	0.828
40	1.156
60	2.02
80	3.13
100	4.61
120	6.50
140	8.52

$KClO_4$ (76, 80, 157, 343, 367, 370, 436, 493)

S	
0	0.052
10	0.078
20	0.121
25	0.149
30	0.182
40	0.268
50	0.376
60	0.568
80	1.04
100	1.56

KBr (4, 63, 105, 144, 200, 202, 254, 324, 426, 485, 495); *cf.* (540)

t, °C	M ± 1%
S	
−10	3.98
0	4.49
+10	4.97
20	5.42
30	5.88
↓ 40	6.31
↓ 100	8.84
t, °C	M ± 5%
110	9.2
120	9.7
140	10.5
160	11.3
180	12.1

$KBrO_3$ (178, 277, 436)

t, °C	M ± 5%
S	
0	0.186
20	0.426
40	0.86
60	1.32
80	2.01

KI (4, 63, 105, 118, 144, 181, 200, 272, 324, 383, 495, 515); *cf.* (540)

t, °C	M ± 2%
S	
−20	6.72
−10	7.23
0	7.72
+10	8.18
20	8.63
30	9.10
↓ 40	9.55
↓ 100*	12.5
120	13.7
140	15.3
160	17.2
180	19.2

* Above 100° less accuracy.

KIO_3 (277, 316)

S	
0	0.220
20	0.380
30	0.491
40	0.604
60	0.870
80	1.16

KIO_4 (23)

t, °C	M
S	
13	0.0287

K_2SO_3 (158)

t, °C	M ± 1%
S	
−30	6.60
−20	6.62
0	6.68
+20	6.74
40	6.81
60	6.89
80	7.00
100	7.14

K_2SO_4 (5, 36, 43, 45, 59, 63, 70, 81, 144, 200, 217, 222, 287, 311, 318, 374, 467, 495, 504, 522)

S	
0	0.423
10	0.530
20	0.637
25	0.690
30	0.742
40	0.848
60	1.041
80	1.220
100	1.382
120	1.52±3%
140	1.65±3%
160	1.77±3%
180	1.89±3%

$K_2S_2O_3$ (252)

S · 2Aq	
0	5.05
S · 5/3Aq	
20	8.20

$K_2S_2O_3$.—(*Continued*)

t, °C	M ± 1%
S · 5/3Aq	
25	8.67
30	9.26
S · 5/3Aq + S · Aq	
35U	10.64
S · Aq	
40	10.76
50	11.30
55	11.91
S · Aq + S · 1/3Aq	
56.1U	12.32
S · 1/3Aq	
60	12.52
70	13.41
75	14.11
S · 1/3Aq + S	
78.3U	15.34
S	
80	15.40
85	15.68
90	16.38

$K_2S_2O_5$ (158)

t, °C	M ± 2%
S	
− 5m	1.10
0m	1.28
+10	1.61
20	2.01
30	2.43
80	4.81
90	5.32
100	5.83
S · 2/3Aq + S	
3U	1.39
S · 2/3Aq	
0	1.26
5m	1.48
10m	1.69
15m	1.93
20m	2.19

$K_2S_2O_6$ (11)

S	
0	0.108
10	0.172
20	0.270
30	0.392

K_2SeO_4 (144, 506)

t, °C	M ± 5%
S	
−20	4.76
0	4.88
+20	5.00
100	5.51

K_2TeO_4 (433)

t, °C	M
S	
0	0.327
10	0.636
20	1.020
30	1.867

KNO_2 (379)

t, °C	M ± 3%
S	
−10	31.6
0	32.9
+20	35.5
40	38.4
120	51.4

KNO_3 (5, 22, 36, 46, 63, 84, 106, 145, 155, 181, 186, 200, 202, 311, 447, 495, 498)

t, °C	M ± 2%
S	
0	1.30
10	2.08
20	3.08
25	3.74
30	4.47
40	6.22
50	8.42
60	10.89
70	13.72
80	16.78
90	20.40
100	24.50
110	29.00

$KNO_3.2HNO_3$ (196)

t, °C	*x*
S	
0	0.530
4	0.577
8	0.631
12	0.692
16	0.770
20	0.880
22	1.000

K_3PO_4 (111)

t, °C	M
25	9.1

KH_2PO_4 (111, 352)

S	
7	2.01
25	2.21

K_3SbS_4 (127)

S · 6Aq	
−34	4.44
−10	5.17
− 5	6.08
S · 5Aq	
0	8.3
+10	8.7
15	8.4
30	8.2
S · 3Aq	
50	9.5
80	10.4

K_2CO_3 (45, 166, 346, 375, 513)

S · *x*Aq	
0	6.46
5	7.52
S · *x*Aq + S · 2Aq	
7(?)	7.88(?)
S · 2Aq	
10	7.9
20	8.0

K_2CO_3.—(*Continued*)

t, °C	M
S · 2Aq	
30	8.2
40	8.4
50	8.8
60	9.2
70	9.6
80	10.1
90	10.6
100	11.3

$K_2C_2O_4$ (102, 165, 214, 265)
Oxalate

t, °C	M ± 3%
S · Aq	
0	1.56
10	1.82
20	2.09
30	2.36
40	2.64
80	3.82
90	4.16
100	4.52

For more extensive data, *v.* (538)

$KHCO_2$ (194)
Formate

t, °C	*x*
−20	0.365
0	0.390
+20	0.420
40	0.456
60	0.500
80	0.555
100	0.621
120	0.711
140	0.836
157	1.000

$KHCO_3$ (122)

t, °C	M ± 10%
S	
0	2.24
10	2.77
20	3.32
30	3.89
60	6.00

KHC_2O_4 (265)
Oxalate

t, °C	M ± 2%
S	
50	1.12
60	1.54
70	2.00
80	2.48
90	3.03
100	3.76

KCH_3CO_2 (1)
Acetate

t, °C	M ± 1%
S · 3/2Aq	
0	22.06
10	23.72
20	25.98
30	29.00
40	32.94

KCH_3CO_2.—(*Continued*)

t, °C	M ± 1%
S · 3/2Aq + S · 1/2Aq	
41.3U	33.50
S · 1/2Aq	
50	34.40
60	35.64
70	37.14
80	38.74
90	40.38
100	42.10

$KCHO_2.CH_2O_2$ (194)
Formate

t, °C	*x*
S	
0	0.174
10	0.199
20	0.227
30	0.260
40	0.298
50	0.345
60	0.402
70	0.476
80	0.574

$KHC_2O_4.H_2C_2O_4$ (265)
Tetroxalate

t, °C	M ± 5%
S · 2Aq	
0	0.052
20	0.131
40	0.284
60	0.548
80	1.00
100	3.31

$KHC_4H_4O_6$ (3, 64, 368, 388, 427)
Tartrate

t, °C	M ± 2%
S	
0	0.017
10	0.0215
20	0.0290
25	0.0348
t, °C	M ± 10%
30	0.043
40	0.065
50	0.092
60	0.128
80	0.240
100	0.375

$KHC_4H_4O_6$ (64)
Racemate

t, °C	M ± 2%
S	
20	0.0268
22	0.0282

$K_2C_4H_4O_8$ (152)
Dihydroxytartrate

t, °C	M
0	0.105

$KHC_4H_4O_8$ (152)
Dihydroxytartrate

0	0.126

$KC_6H_5CO_2$ (380, 463)
Benzoate

t, °C	M ± 2%
S	
0	3.98
10	4.20
20	4.47
30	4.77
↓ 80	6.49
100	7.28
120	8.20
140	9.28
160	10.51
180	12.08

$KC_7H_5O_3$ (463)
Salicylate

t, °C	M ± 3%
S · Aq	
0	4.46
10	5.14
20	6.08
30	7.34
S · Aq + S	
31U	7.62
S	
40	7.94
60	9.00
80	10.4
100	12.3
120	14.6
140	17.1

$KC_7H_5O_3$ (463)
m-Hydroxybenzoate

S	
0	8.19
20	8.70
40	9.47
60	10.5
80	11.8
100	13.4
120	15.3
140	17.4

$KC_7H_5O_3$ (463)
p-Hydroxybenzoate

S · 3Aq	
10	2.10
20	2.70
30	3.50
40	4.45
50	5.57
60	6.84
70	8.21
S · 3Aq + S	
79U	9.51
S	
80	9.53
90	9.73
100	9.94
110	10.1
120	10.3
130	10.5

$KHC_6H_4(CO_2)_2$ (218)
Phthalate

t, °C	M
25	0.502
35	0.621

$KC_2H_5SO_4$ (205)
Ethylsulfate

t, °C	M ± 3%
S(α) + Ice (?)	
−12.9	4.69
S(α)	
−10	5.16
0	6.78
+10	9.04
20	12.1
30	16.0
40	21.0
50	27.1
S(α) + S(β)	
51.8U	28.4
S(β) + Ice (?)	
−15.2m	5.76
S(β)	
−10m	6.57
0m	8.66
+10m	11.2
20m	14.3
↓ 50m	27.4
60	32.8
70	38.2
80	44.3
90	51.1

$K_2(H_6TeO_6C_2O_4)$ (433)
Oxalotellurate

t, °C	M
S	
0	0.069
10	0.100
20	0.135
30	0.174
40	0.229
50	0.312

KCN (293)

S	
25	11.00

KCNO (293)

S	
25	9.25

$KC_6H_2(NO_2)_3O$ (156)
Picrate

S	
25	0.0243

KCNS (161, 437)

t, °C	M ± 3%
S	
0	18.2
10	19.5
20	22.2
25	24.6

$KHC_{10}H_5NH_2(SO_3)_2$
$K_2C_{10}H_5NH_2(SO_3)_2$
Naphthylaminedisulfonates
v. p. 219

$KClNO_2C_6H_2CH_3SO_3$ (113)
Chloronitro-*m*-toluene sulfonate

t, °C	M ± 3%
0	0.0081
10	0.0097
20	0.0135
30	0.0197

K_2ZrF_6 (308, 333)

t, °C	M ± 5%
10	0.0432
20	0.0547
30	0.0679
40	0.0835
50	0.104
60	0.135
70	0.179
80	0.244
90	0.392
100	0.85

K_2SnO_3 (535)

t, °C	M
S · 4Aq	
28	5.01
S · 5Aq	
28	5.35

K_2SnF_6 (55)

S · Aq	
18	0.104 ± 5%

K_2SnOHF_5 (55)

S · Aq	
18	0.214 ± 5%

$K_2SO_4.ZnSO_4$ (299)

S · 6Aq	
25	0.393

$KCl.CdCl_2$ (421)

S · Aq	
0	1.01
20	1.54
40	2.08
60	2.64
80	3.24
100	3.93

$KBr.CdBr_2$ (422)

S · Aq	
0	2.90
20	3.83
40	4.88
60	5.98
80	7.12
100	8.33
110	8.95

$K_2SO_4.CuSO_4$ (81, 299, 318, 504)

t, °C	M ± 3%
S · 6Aq	
25	0.341
30	0.390
40	0.517
50	0.681
60	0.887

$KAuCl_4$ (429)

S · 0.5Aq	
10	1.01
20	1.63

$KAuCl_4$.—(*Continued*)

t, °C	M ± 3 %
S · 0.5Aq	
30	2.51
40	3.84
50	6.17
60	10.7

K_2IrCl_6 (185.5)

K_2PtCl_6 (6)

t, °C	M ± 2%
0	0.0091
10	0.0110
20	0.0153
30	0.0203
40	0.0281
60	0.0501
↓ 90	0.0897

$K_2Pt(CN)_4$ (491)

S · 5Aq	
0	0.307
5	0.376
10	0.536
S · 5Aq + S · 3Aq	
14.4U	0.703
S · 3Aq	
15	0.720
20	0.890
30	1.400
40	2.080
50	2.87
S · 3Aq + S · 2Aq	
52.8U	3.22
S · 2Aq	
55	3.27
↓ 70	4.33
S · 2Aq + S · Aq	
74.5U	4.64
S · Aq	
80	4.61
85	4.77
90	5.09
95	5.59

$KMnO_4$ (31, 224, 387, 505, 511, 512)

S	
0	0.180
10	0.272
20	0.405
25	0.484
30	0.569
40	0.793
50	1.065
65	1.584

$K_2Fe(SO_4)_2$ (281)

t, °C	M*
S · 6Aq	
0	0.62
10	0.75
20	0.89
30	1.06
40m	1.24
S · 6Aq + S · 4Aq	
30U	1.06

* Per l soln.

$K_2Fe(SO_4)_2$.—(Continued)

t, °C	M*
S · 6Aq + S · 2Aq	
50mU	1.47
S · 4Aq	
40	1.10
60	1.21
80	1.37
90m	1.48
S · 4Aq + S · 2Aq	
86U	1.44
S · 2Aq	
60m	1.46
80m	1.44
100	1.43

* Per 1 soln.

$K_3Fe(CN)_6$ (517)

t, °C	M
S	
0	0.92
10	1.11
20	1.34
30	1.59
40	1.85

$K_4Fe(CN)_6$ (54, 144, 146, 210, 327, 448, 508, 514)

S · 3Aq	
0	0.396
20	0.762
40	1.130
100	2.224

$K_2SO_4.CoSO_4$ (299)

S · 6Aq	
25	0.391

$K_3Co(C_2O_4)_3$ (249)
l-Trioxalocobaltiate

S · Aq	
20	0.849
22	0.854

$K_3Co(C_2O_4)_3$ (249)
dl-Trioxalocobaltiate

S · 3.5Aq	
0	0.784
14	0.836

$K_2SO_4.NiSO_4$ (299)

S · 6Aq	
25	0.209

K_2CrO_4 (3, 106, 144, 201, 264, 327, 363, 447, 449)

t, °C	M ± 1%
S	
−10	2.84
0	2.96
+20	3.22
40	3.49
60	3.78
80	4.09
100	4.45
110	4.66

$K_2Cr_2O_7$ (3, 144, 199, 264, 287, 327, 449, 495)

t, °C	M ± 5%
S	
0	0.158
10	0.240
20	0.390

$K_2Cr_2O_7$.—(Continued)

t, °C	M ± 5%
S	
30	0.616
40	0.90
50	1.21
60	1.54
80	2.31
100*	3.30
120	4.60
140	5.94
160	7.40
180	9.08

* Above 100° less accurate.

$K_2SO_4.Cr_2(SO_4)_3$ (298)

t, °C	M
S · 12Aq	
25	0.44

$KAl(SO_4)_2$ (36, 57, 298, 310)

t, °C	M ± 3%
S · 12Aq	
0	0.117
10	0.162
20	0.228
30	0.320
40	0.458
50	0.664
60	0.948
70	1.390
80	2.12
85	2.72
88	3.48

$K_2SO_4.BeSO_4$ (59)

t, °C	M
S · 2Aq	
25	1.43

$KNaCO_3$ (375)

S · 6Aq	
25	5.14

$KNaC_4H_4O_6$ (65, 235)
Tartrate

S · 4Aq	
− 4.3	1.24
0	1.50
+10	2.24
20	3.23
30	4.90

$KNaC_4H_4O_6$ (65, 235)
Racemate

S · 3Aq	
− 6.3	1.84
0	2.14
+10	2.77
20	3.50
30	4.45

RbOH (168)

15	17.5

RbCl (36)

t, °C	M ± 1%
S	
0	6.36
10	6.96
20	7.53
30	8.07
90	11.02
110	11.95

$RbClO_3$ (76, 80, 408)

t, °C	M ± 3%
S	
0	0.127
10	0.201
20	0.319
30	0.474
40	0.680
50	0.946
60	1.32
70	1.75
80	2.26
90	2.88
100	3.82

$RbClO_4$ (76, 80, 157)

t, °C	M ± 5%
S	
10	0.0345
20	0.053
30	0.083
40	0.132
50	0.192
60	0.262
70	0.363
80	0.500
90	0.685
100	0.975

RbBr (408, 422)

t, °C	M ± 2%
S	
0	5.38
20	6.68
60	9.32
80	10.60
100	11.73
110	12.25

$RbBrO_3$ (73)

t, °C	M ± 1%
S	
25	0.137
30	0.166
35	0.201
40	0.238

RbI (408)

t, °C	M
S	
6.9	6.47
17.4	7.16

$RbIO_4$ (23)

S	
13	0.0236

Rb_2SO_4 (36, 144)

t, °C	M ± 1%
S	
0	1.36
10	1.58
20	1.79
30	2.00
40	2.20
50	2.37
90	2.95
110	3.16

Rb_2SeO_4 (506)

t, °C	M
12	5.06

$RbNO_3$ (36)

t, °C	M ± 2%
S	
0	1.33
10	2.26
20	3.65
30	5.55
40	7.90
50	10.6
60	13.6
70	17.1
80	21.1
90	25.6
100	30.5
110	36.2
120	43.2

Rb_2CO_3 (166)

t, °C	M
15	9.6

$RbHCO_2$ (464)
Formate

t, °C	M ± 2%
S · Aq	
0	26.0
10	34.2
S · Aq + S · 0.5Aq	
16.5U	42.4
S · 0.5Aq	
20	43.6
25	45.1
30	46.7
40	52.1
50	62.8
S · 0.5Aq + S	
51U	65.2
S	
50m	64.7
60	68.4
80	83.3
100	114.3
120	173.8
140	314
160	1065
170	∞

$RbHCO_3$ (167)

t, °C	M
15	7.9

$RbCH_3CO_2$ (464)
Acetate

t, °C	M ± 2%
S	
0	34.3
40	40.7
80	51.2
120	70.6
160	114.3
200	250
240	2360
246	∞

$Rb_2C_4H_4O_8$ (152)
Dihydroxytartrate

t, °C	M
0	0.198

$RbC_6H_5CO_2$ (463)
Benzoate

t, °C	M ± 3%
S	
20	6.26
40	6.78
60	7.47
80	8.27
100	9.17
120	10.12
140	11.10

$RbC_7H_5O_3$ (463)
Salicylate

t, °C	M ± 2%
S · Aq	
10	8.4
20	9.5
30	10.9
S · Aq + S	
40U	12.8
S	
50	13.5
60	14.4
80	16.8
100	20.4
120	25.0
130	27.5

$RbC_7H_5O_3$ (463)
m-Hydroxybenzoate

t, °C	M
S · Aq	
−10	4.30
0	4.40
+10	4.56
20	4.82
30	5.32
40	6.10
S · Aq + S	
47U	7.00
S	
50	7.20
60	8.00
80	9.36
100	11.62
120	15.62
130	17.90

$RbC_7H_5O_3$ (463)
p-Hydroxybenzoate

t, °C	M
S · Aq	
20	2.60
30	3.04
40	3.58
50	4.16
6C	4.92
70	5.84
S · Aq + S	
78U	6.80
S	
80	6.96
90	7.86
100	9.20
110	10.80
120	12.64

$Rb_2(TeC_2O_4(OH)_6)$ (433)
Oxalotellurate

t, °C	M ± 2%
S	
0	0.079
10	0.107
20	0.148
30	0.192
40	0.261
50	0.346

$Rb_2SO_4.ZnSO_4$ (299)

t, °C	M
S · 6Aq	
25	0.236

$RbBr.CdBr_2$ (422)

t, °C	M
S	
0	1.11
20	1.87
40	2.70
60	3.73
80	4.93
100	6.41
110	7.44

$4RbCl.CdBr_2$ (422)

t, °C	M
0	0.96
↓ 20	1.48
↓ 120	4.20

$Rb_2SO_4.CdSO_4$ (299)

t, °C	M
S · 6Aq	
25	1.63

$Rb_2SO_4.CuSO_4$ (299)

t, °C	M
S · 6Aq	
25	0.242

$RbAuCl_4$ (429)

t, °C	M ± 3%
S	
10	0.113
20	0.223
30	0.365
40	0.507
↓ 50	0.672
↓ 80	1.29
↓ 100	1.87

$RbMnO_4$ (352, 387)

t, °C	M ± 5%
S	
0	0.020
7 (352)	0.048
10	0.035
20	0.053
30	0.079
40	0.113
50	0.159
60	0.229

$Rb_2SO_4.MnSO_4$ (299)

t, °C	M
S · 6Aq	
25	0.86

$RbFe(SO_4)_2$ (298)

t, °C	M
S · 12Aq	
25	0.295

$Rb_2Fe(SO_4)_2$ (299)

t, °C	M
S · 6Aq	
25	0.58

$Rb_2SO_4.CoSO_4$ (299)

t, °C	M
S · 6Aq	
25	0.221

$Rb_2SO_4.NiSO_4$ (299)

t, °C	M
S · 6Aq	
25	0.142

$RbCr(SO_4)_2$ (298)

t, °C	M
S · 12Aq	
25	0.079
30	0.096
35	0.128
40	0.181

$RbV(SO_4)_2$ (298)

t, °C	M
S · 12Aq	
25	0.177

$RbAl(SO_4)_2$ (36, 298, 459)

t, °C	M ± 2%
S · 12Aq	
0	0.0236
10	0.0343
20	0.0503
30	0.0725
40	0.104
50	0.158
60	0.241
70	0.412

$Rb_2SO_4.MgSO_4$ (299)

t, °C	M
S · 6Aq	
25	0.523

CsOH (168)

t, °C	M
15	25.8

CsCl (36, 160, 233)

t, °C	M ± 0.5%
S	
0	9.61
10	10.32
20	10.98
25	11.34
30	11.68
40	12.34
50	12.98
↓ 60	13.61
↓ 100	16.07
120	17.26

$CsClO_3$ (76)

t, °C	M ± 2%
S	
0	0.114
10	0.178
20	0.293
30	0.445
40	0.642
50	0.900
60	1.21
70	1.58
80	2.13
90	2.81
100	3.64

$CsClO_4$ (76, 80, 157)

t, °C	M ± 2%
S	
10	0.043
20	0.069
25	0.088
30	0.111
40	0.165
50	0.229
60	0.315
70	0.420
80	0.600
90	0.90
100	1.27

CsBr (162)

t, °C	M
S	
25	5.80

$CsBrO_3$ (73)

t, °C	M
S	
25	0.1404 ± 1%
30	0.174 ± 1%
35	0.204 ± 1%

CsI (159)

t, °C	M
S	
− 4.0	1.48
+35.6	4.06

$CsIO_4$ (23)

t, °C	M
15	0.0664

Cs_2SO_4 (36)

t, °C	M ± 1%
S	
0	4.62
10	4.78
20	4.93
30	5.08
40	5.23
↓ 50	5.38
↓ 110	6.23

Cs_2SeO_4 (506)

t, °C	M
S	
12	6.00

$CsNO_3$ (36)

t, °C	M ± 3%
S	
0	0.47
10	0.79
20	1.26
30	1.86
40	2.61
50	3.50
60	4.52
70	5.64
80	6.92
90	8.40
100	10.10
110	12.2

Cs_2CO_3 (166)

t, °C	M
15	8.0

$Cs_2C_2O_4$ (165)
oxalate

t, °C	M
25	8.86

$CsHCO_2$ [464]
Formate

t, °C	M ± 2%
S · Aq	
0	18.8
10	21.3
20	24.6
30	29.6
40	38.9
43	45.4
45	55.5
43	78.3
S · Aq + S	
41E	90.6
S	
50	93.8
75	102.1
100	115.3
125	134.5
150	158.0
175	193.4
200	250
225	371
250	870
265	∞

$CsHCO_3$ [167]

t, °C	M
15	10.8

$CsCH_3CO_2$ [464]
Acetate

t, °C	M ± 2%
0	49.4
20	52.7
40	55.5
60	60.0
80	65.9
100	76.3
120	94.5
140	129.5
160	206.5
180	480
194	∞

$Cs_2C_4H_4O_8$ [152]
Dihydroxytartrate

t, °C	M
0	0.65

$CsC_6H_5CO_2$ [463]
Benzoate

t, °C	M ± 2%
0	11.60
20	12.00
60	13.68
80	14.62
100	15.74
120	17.02

$CsC_7H_5O_3$ [463]
Salicylate

t, °C	M ± 2%
S · Aq	
0	7.27
10	8.51
20	10.66
30	13.88
40	17.82

$CsC_7H_5O_3$.—(*Continued*)

t, °C	M ± 2%
S · Aq + S · 0.5Aq	
41U	18.5
S · 0.5Aq	
50	20.5
60	26.1
70	36.4
S · 0.5Aq + S	
74U	41.9
S	
80	45.1
90	50.6
100	56.4
110	63.1

$CsC_7H_5O_3$ [463]
m-Hydroxybenzoate

S · xAq	
10	12.4
20	13.7
30	17.2
40	23.4
S · xAq + S	
44U	27.1
S	
50	28.1
60	29.9
80	34.7
100	41.4
120	49.4

$CsC_7H_5O_3$ [463]
p-Hydroxybenzoate

S · Aq	
10	1.80
20	2.22
30	2.66
40	3.20
50	3.80
60	4.60
S · Aq + S	
64U	5.00
S	
70	5.32
80	6.04
100	7.96
120	10.80
135	14.28

$Cs_2[TeC_2O_4(OH)_6]$ [433]
Oxalotellurate

S	
0	0.110
10	0.152
20	0.202
30	0.259
40	0.339
50	0.474

$CsGa(SO_4)_2$ [119]

t, °C	M
S · 12Aq	
25	0.0383

$CsGa(SeO_4)_2$ [119]

S · 12Aq	
25	0.085

$CsIn(SO_4)_2$ [298]

t, °C	M
S · 12Aq	
25	0.172

$Cs_2SO_4.ZnSO_4$ [299]

S · 6Aq	
25	0.74

$Cs_2SO_4.CdSO_4$ [299]

S · 6Aq	
25	2.46

$Cs_2SO_4.CuSO_4$ [299]

S · 6Aq	
25	0.89

$CsAuCl_4$ [429]

t, °C	M ± 5%
S	
10	0.0106
20	0.0170
30	0.036
40	0.070
50	0.121
60	0.189
70	0.289
80	0.413
90	0.587
100	0.803

$CsMnO_4$ [387]

S	
0	0.0037
10	0.0058
20	0.0092
30	0.0146
40	0.0216
50	0.0333
60	0.0520

$Cs_2SO_4.MnSO_4$ [299]

t, °C	M
S · 6Aq	
25	1.57

$CsFe(SO_4)_2$ [298]

t, °C	M
S · 12Aq	
25	0.045
30	0.066
35	0.099
40	0.156

$Cs_2Fe(SO_4)_2$ [299]

S · 6Aq	
25	1.99

$Cs_2SO_4.CoSO_4$ [299]

S · 6Aq	
25	0.81

$Cs_2SO_4.NiSO_4$ [299]

S · 6Aq	
25	0.50

$CsCr(SO_4)_2$ [298]

S · 12Aq	
25	0.016
40	0.041

$CsV(SO_4)_2$ [298]

S · 12Aq	
25	0.020

$CsAl(SO_4)_2$ [36, 212, 298, 459]

t, °C	M ± 5%
S · 12Aq	
0	0.006
10	0.009
20	0.012
30	0.017
40	0.024
50	0.038
60	0.058
70	0.095
80	0.162
90	0.302
100	0.62

$Cs_2SO_4.MgSO_4$ [298]

t, °C	M
S · 6Aq	
25	1.11

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(For a key to the periodicals see end of volume)

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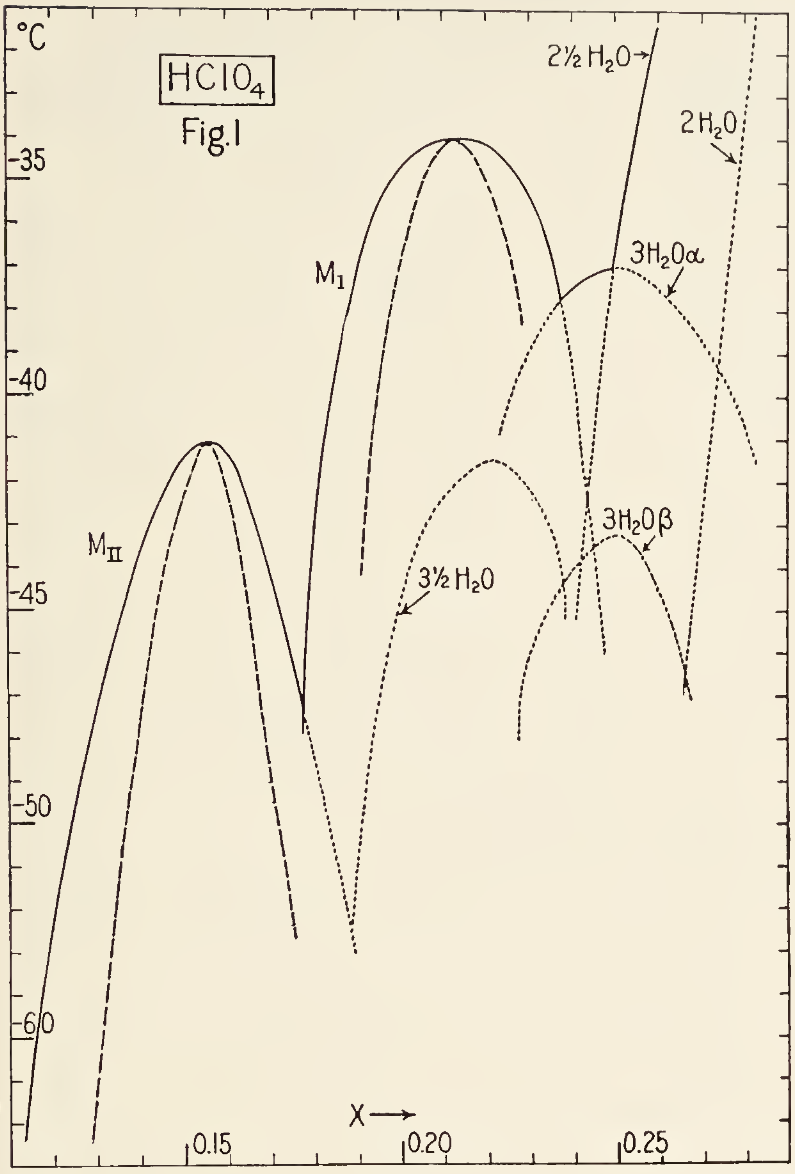
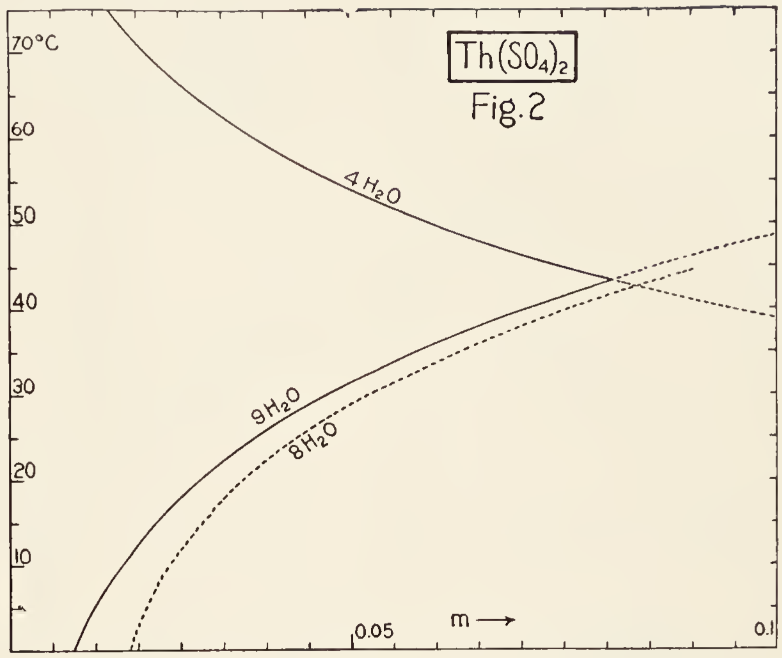
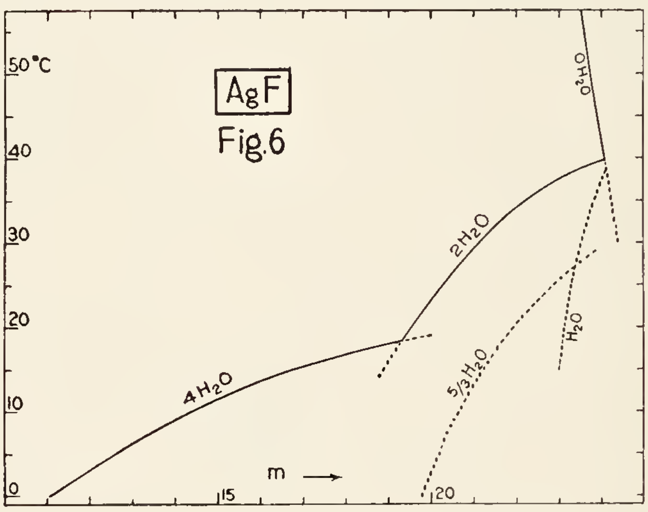
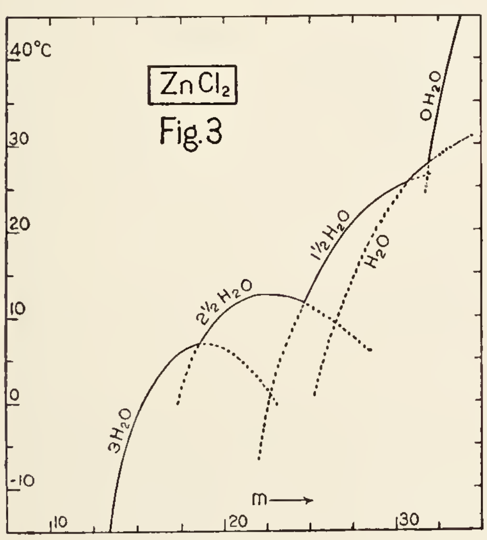
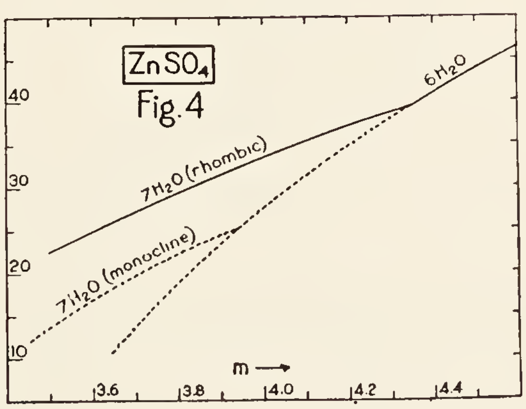
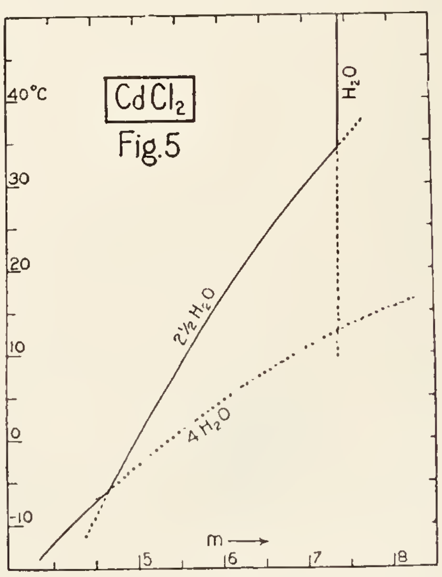










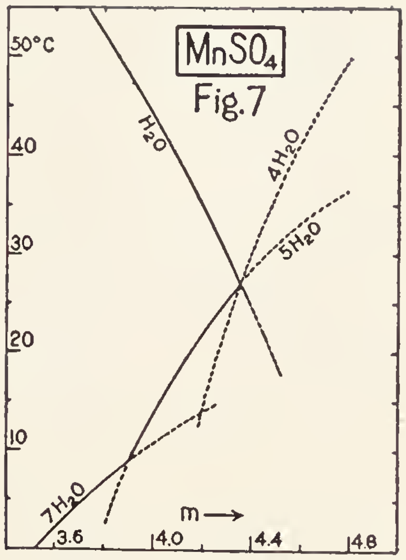


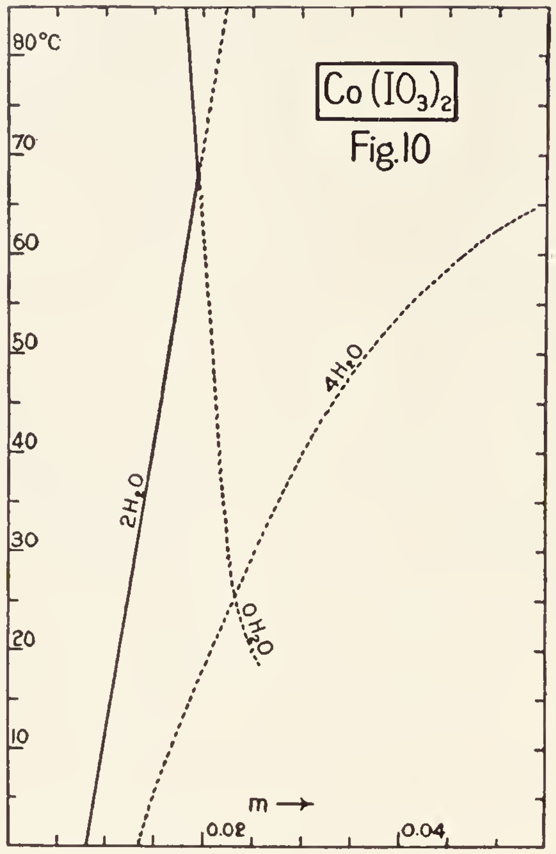
(50) Bolschokov, *53*, **30**: 386; 98. (51) Bourgeois, *27*, **19**: 949; 98. (52) Boyer-Guillon, *Ann. Conserv. Arts et Mét.*, **2**: 187; 00. (53) Bray and Winninghoff, *1*, **33**: 1663; 11. (54) Briggs, *4*, **99**: 1019; 11. (55) Briggs, *93*, **82**: 441; 13. (56) Britton, *4*, **119**: 1967; 21. (57) Britton, *4*, **121**: 982; 22. (58) Britton, *4*, **121**: 2612; 22. (59) Britton and Allmand, *4*, **119**: 1463; 21.

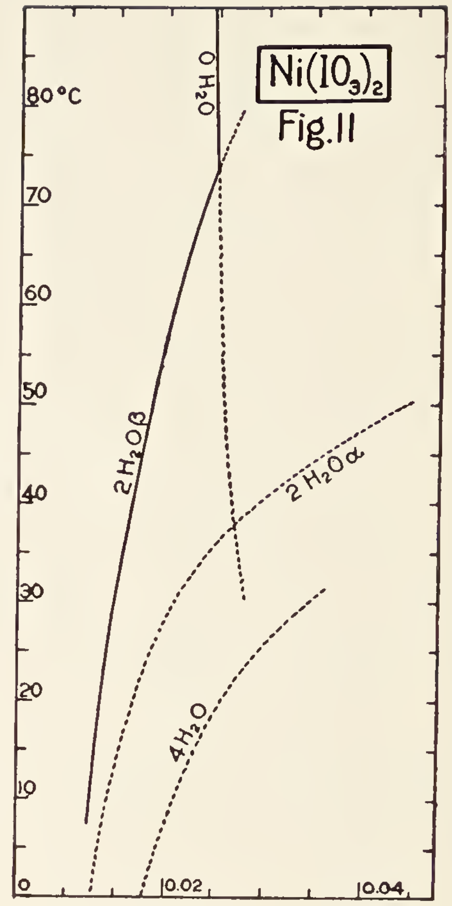
(60) Brönsted, *7*, **56**: 645; 07. (61) Brönsted, *7*, **68**: 693; 09. (62) Brönsted, *7*, **77**: 129; 11. (63) Brönsted, *7*, **82**: 621; 13. (64) Brönsted, *137*, **12**: No. 6; 15. (65) Brönsted, *137*, **12**: No. 12; 15. (66) Brönsted, *7*, **100**: 139; 22. (67) Brönsted, *1*, **44**: 877; 22. (68) Brönsted and La Mer, *1*, **46**: 555; 24. (69) Brönsted and Petersen, *1*, **43**: 2265; 21.

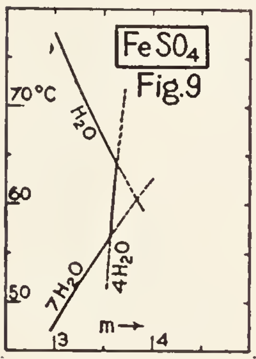
(70) Bruni, *36*, **27 I**: 537; 97. (71) Buchanan and Winner, *45*, **12**: 448; 20. (72) Büchner and Prins, *7*, **81**: 113; 13. (73) Buell and McCrosky, *1*, **43**: 2031; 21. (74) Bury, *4*, **125**: 2538; 24. (75) Callendar and Barnes, *5*, **62**: 117; 98. (76) Calzolari, *36*, **42 II**: 85; 12. (77) Cameron and Robinson, *50*, **11**: 273; 07. (78) Cantoni and Basadonna, *27*, **35**: 727; 06. (79) Cantoni and Zachoder, *27*, **33**: 747; 05.

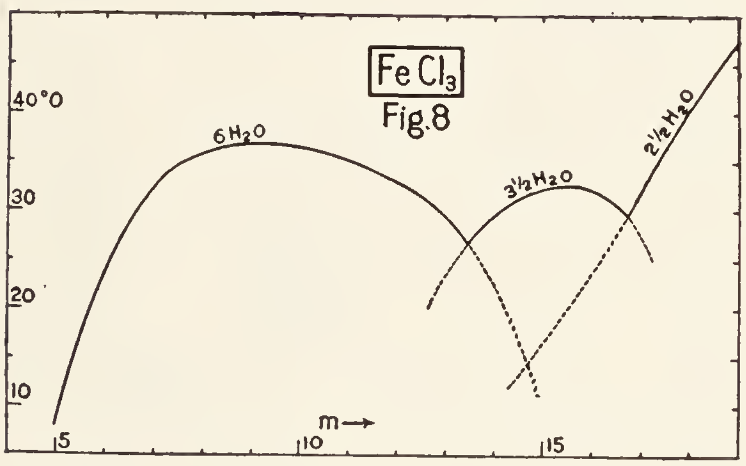
(80) Carlson, *Klason Festskrift*, **1910**: 247. (80.5) Cavazzi, *36*, **46 II**: 122; 16. (81) Caven and Mitchell, *4*, **125**: 1428; 24. (82) Chancel and Parmentier, *34*, **104**: 474; 87. (83) Chugaev, *93*, **137**: 1; 24. (84) Chugaev and Chlopin, *93*, **86**: 154; 14. (85) Chugaev and Kiltinovich, *4*, **109**: 1286; 16. (86) Cingolati, *36*, **38 I**: 292; 08. (87) Clark, *1*, **41**: 1477; 19. (88) Clendinnen, *4*, **121**: 801; 22. (89) Cleve, *93*, **32**: 129; 02.

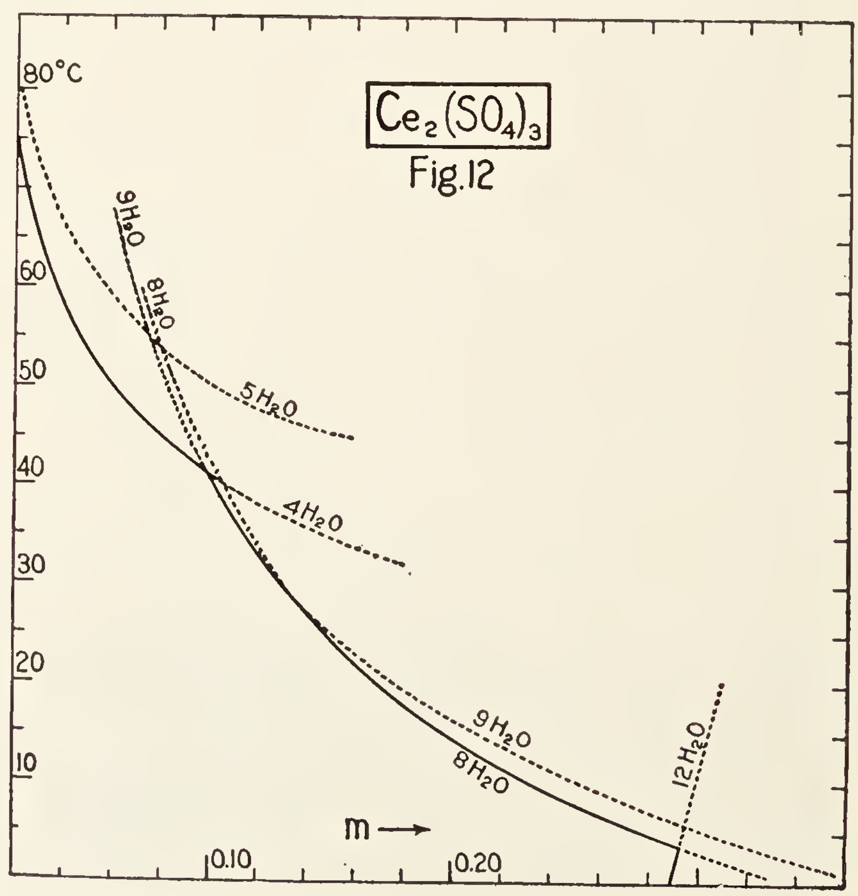

MnSO$_4$
Fig.7
50°C
40
30
20
10
H$_2$O
4H$_2$O
5H$_2$O
7H$_2$O
m →
3.6
4.0
4.4
4.8

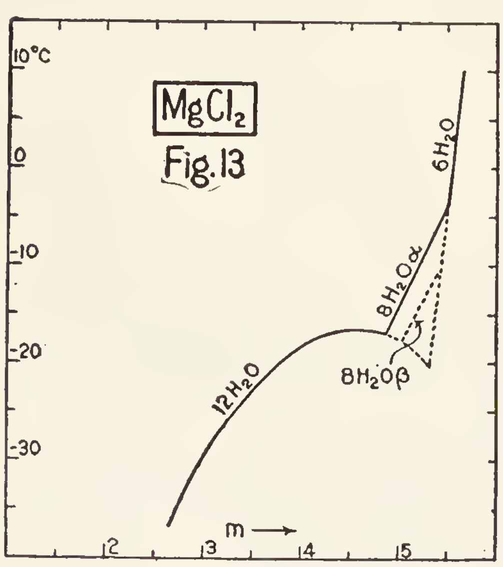

Co(IO$_3$)$_2$
Fig.10
80°C
70
60
50
40
30
20
10
2H$_2$O
4H$_2$O
0H$_2$O
m →
0.02
0.04

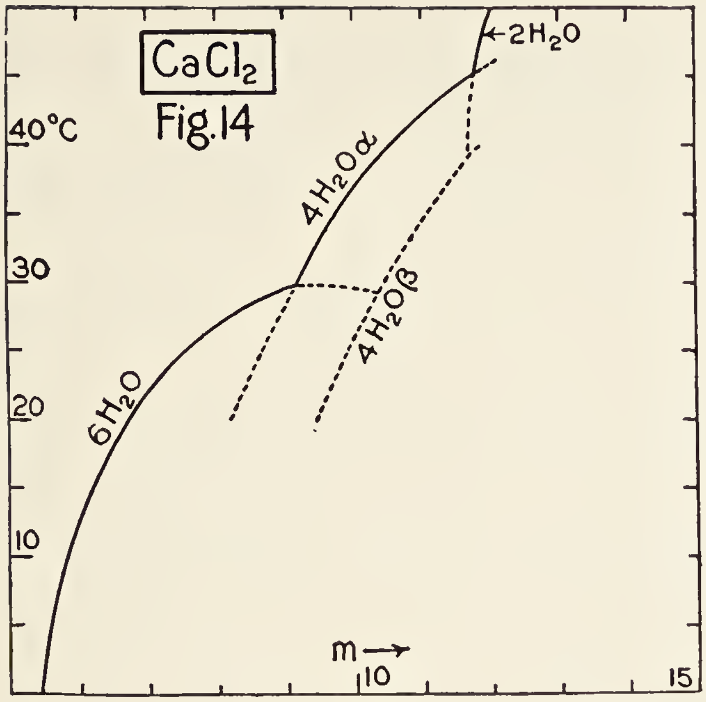

Ni(IO$_3$)$_2$
Fig.11
80°C
70
60
50
40
30
20
10
0
0H$_2$O
2H$_2$O β
2H$_2$O α
4H$_2$O
0.02
0.04

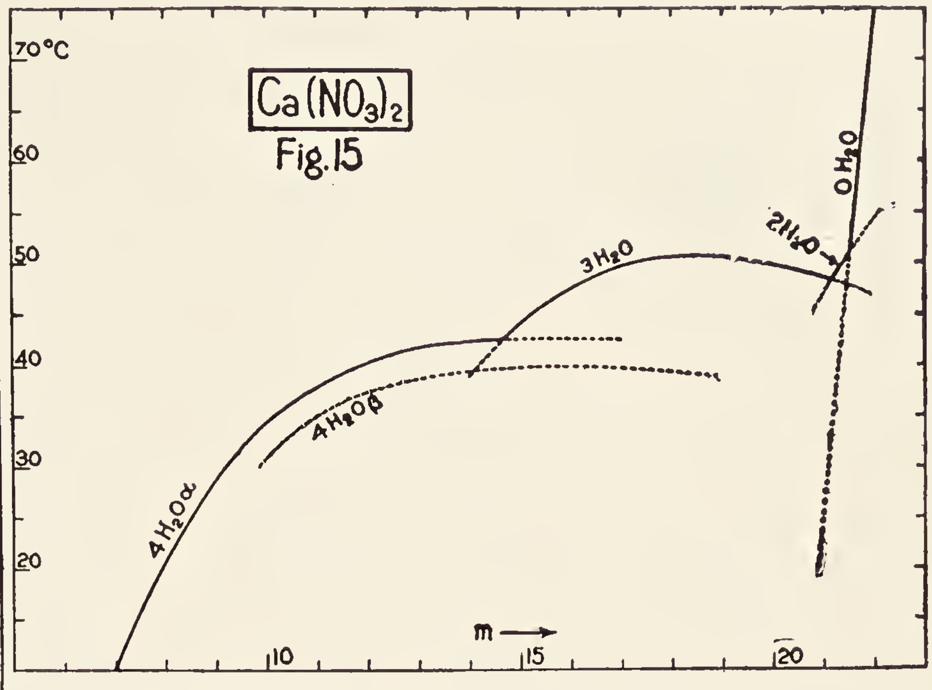

FeSO$_4$
Fig.9
70°C
60
50
H$_2$O
7H$_2$O
4H$_2$O
m →
13
14

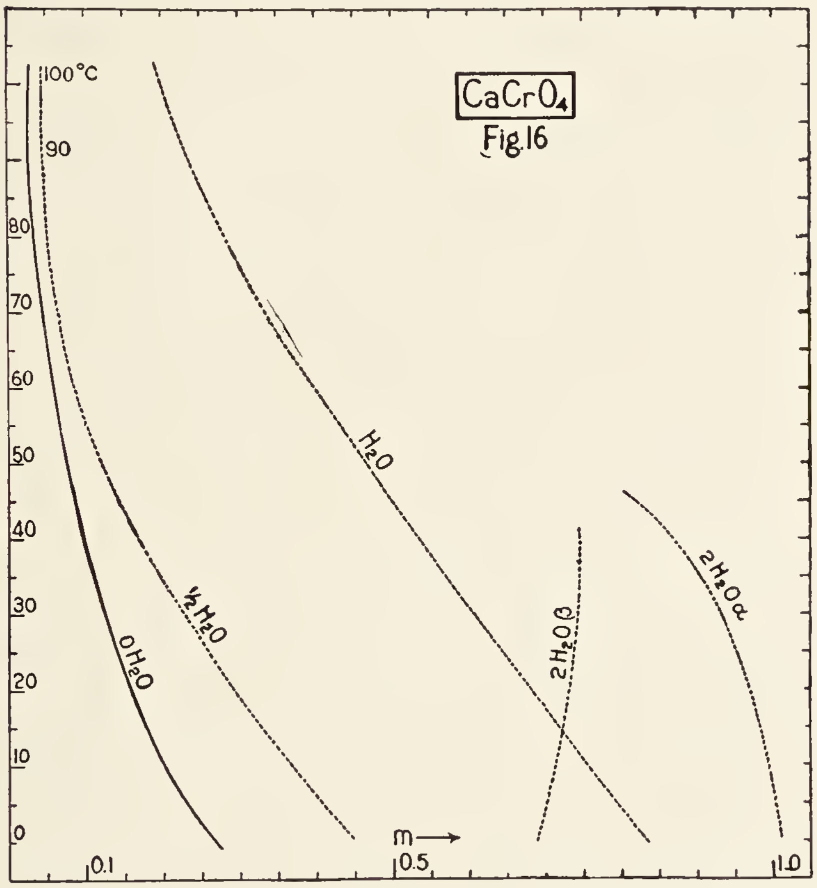

FeCl$_3$
Fig.8
40°C
30
20
10
6H$_2$O
3½H$_2$O
2½H$_2$O
m →
5
10
15

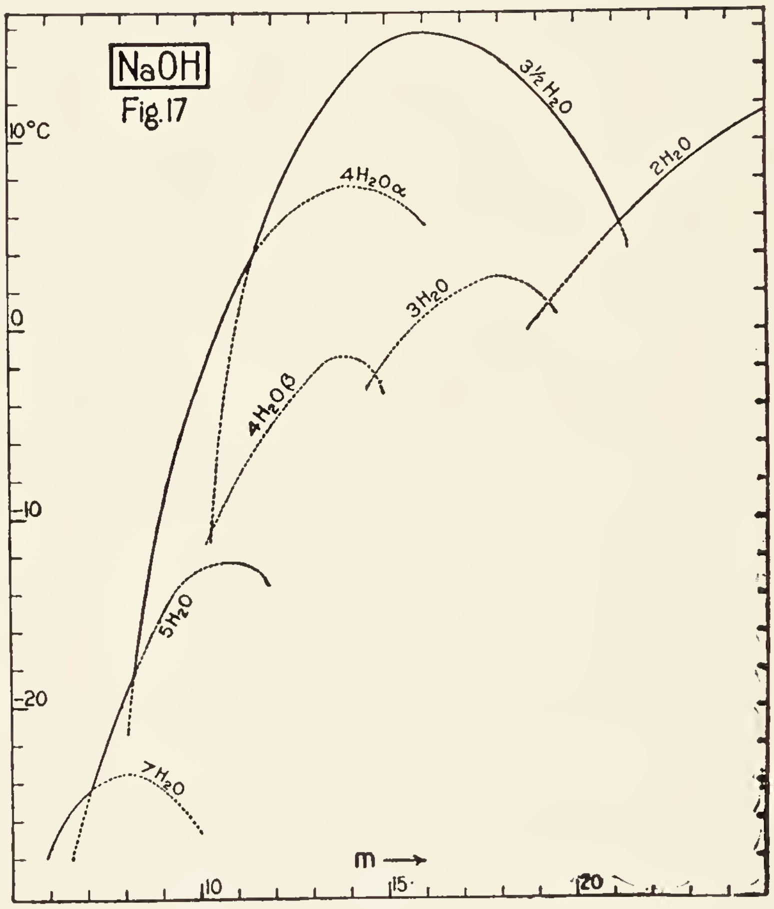

Ce$_2$(SO$_4$)$_3$
Fig.12
80°C
60
50
40
30
20
10
9H$_2$O
8H$_2$O
5H$_2$O
4H$_2$O
9H$_2$O
8H$_2$O
12H$_2$O
m →
0.10
0.20


MgCl$_2$
Fig.13
10°C
0
-10
-20
-30
6H$_2$O
8H$_2$O α
8H$_2$O β
12H$_2$O
m →
2
3
4
5









(90) Cocheret, *Diss.*, Leiden, 1911. (91) Cohen, *7*, **31**: 164; 99. (92) Cohen, *7*, **34**: 179; 00. (93) Cohen and van den Bosch, *64V*, **31**: 606; 23. (94) Cohen and Bruins, *7*, **93**: 43; 19. (95) Cohen and Crommelin, *9*, **9**: 431; 03. (96) Cohen, Hetterschij and Moesveld, *7*, **94**: 210; 20. (97) Cohen, Inouye and Euwen, *7*, **75**: 257; 11. (98) Cohen, Ishikawa and Moesveld, *7*, **105**: 155; 23. (99) Cohen and Kooii, *64P*, **27**: 65; 24.

(100) Cohen, Voller and Moesveld, *7*, **104**: 323; 23. (101) Cohen and Wolters, *7*, **96**: 253; 20. (102) Colani, *27*, **19**: 405; 16. (103) Colani, *34*, **165**: 111; 17. (104) Coppadoro, *36*, **42** I: 233; 12. (105) de Coppet, *6*, **30**: 411; 83. (106) de Coppet, *7*, **22**: 239; 97. (107) Cottrell, *50*, **4**: 637; 00. (108) Courtois, *34*, **158**: 1511; 14. (109) Creighton and Ward, *1*, **37**: 2333; 15.

(110) Crew, Steinert and Hopkins, *50*, **29**: 34; 25. (111) D'Ans and Schreiner, *7*, **75**: 95; 11. (112) D'Ans and Siegler, *7*, **82**: 35; 13. (113) Davies and Davies, *4*, **123**: 2976; 23. (114) Dawson, *4*, **113**: 675; 18. (115) Dawson and Williams, *7*, **31**: 59; 99. (116) De, *4*, **111**: 55; 17. (117) Demarçay, *34*, **96**: 1859; 83. (118) Demassieux, *34*, **177**: 51; 23. (119) Dennis and Bridgman, *1*, **40**: 1531: 18.

(120) de Pauw, *Diss.*, Utrecht, 1922. (121) Deszáthy, *57*, **14**: 245; 93. (122) Dibitts, *52*, **118**: 417; 74. (123) Dietz, *93*, **20**: 240; 99. (124) Ditte, *6*, **22**: 551; 81. (125) Ditte, *34*, **123**: 1281; 96. (126) Dittrich, *7*, **29**: 485; 99. (127) Donk, *176*, **5**: 629; 08. (128) Donk, *176*, **5**: 767; 08. (129) Donk, *176*, **13**: 92; 16.

(130) Donnan and Burt, *4*, **85**: 335; 03. (131) Drucker, *93*, **28**: 361; 01. (132) Duboux and Cuttat, *37*, **4**: 735; 21. (133) Dukleski, *93*, **50**: 38; 06. (134) Dundon and Henderson, *1*, **44**: 1196; 22. (135) Eder, *75*, **82**: 1284; 80. (136) Elliot, *50*, **28**: 887; 24. (137) von Ende, *93*, **26**: 129; 01. (138) Engel, *6*, **13**: 344; 88. (139) Engel, *6*, **13**: 370; 88.

(140) Engel, *6*, **17**: 338; 89. (141) Ephraim, *25*, **56**: 1530; 23. (142) Ephraim and Mosimann, *25*, **55**: 1608; 22. (143) Epple, *Diss.*, Heidelberg, 1899. (144) Étard, *6*, **2**: 503; 94. (145) Euler, *7*, **49**: 303; 04. (146) Fabris, *36*, **51** II: 374; 21. (147) Fajans and Fischler, *93*, **95**: 284; 16. (148) Fajans and Lembert, *93*, **95**: 297; 16. (149) Fedotiev, *7*, **49**: 162; 04.

(150) Fedotiev, *93*, **73**: 173; 11. (151) Fedotiev and Koltunov, *93*, **85**: 247; 14. (152) Fenton, *4*, **73**: 472; 98. (153) Ferchland, *93*, **30**: 130; 02. (154)

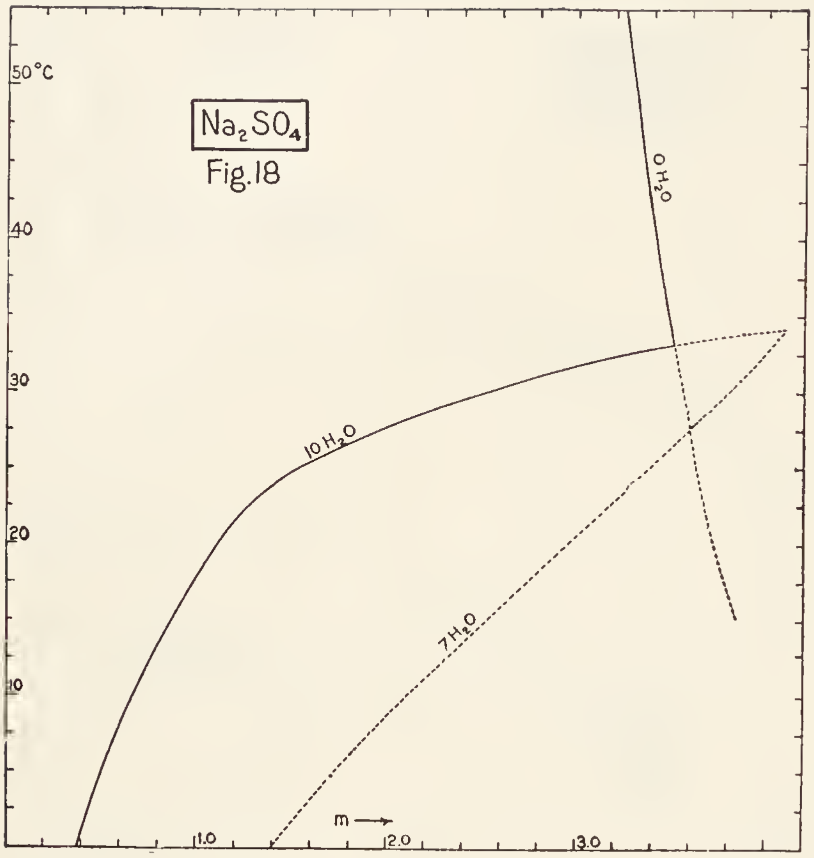


Fig. 18

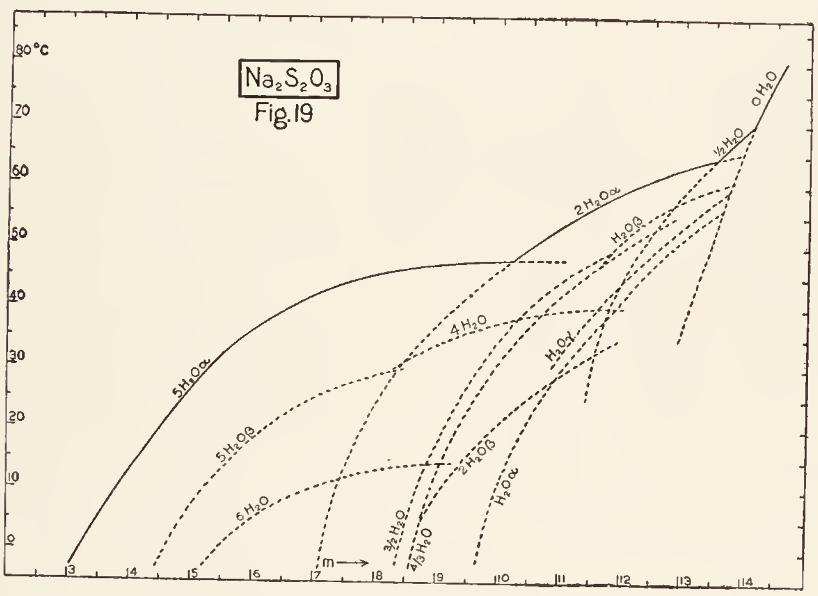


Fig. 19

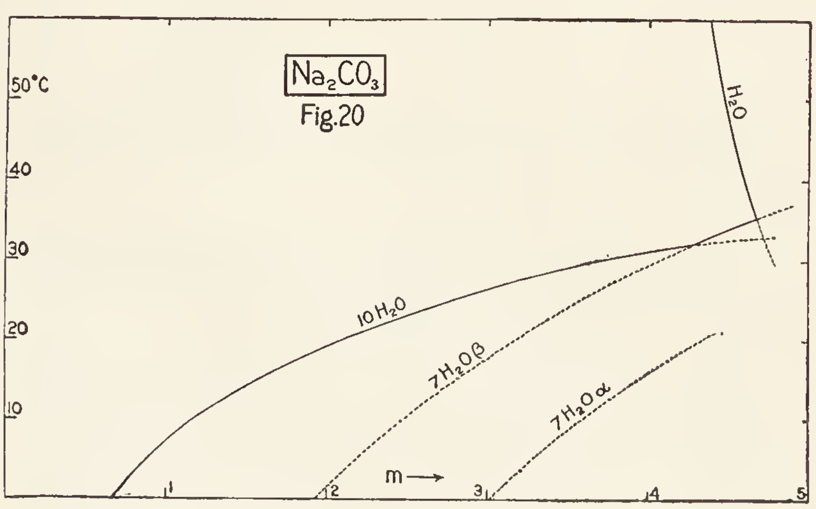


Fig. 20

Fierz-David and Braunschweig, *37*, **6**: 1146; 23. (155) Findlay, Morgan and Morris, *4*, **105**: 779; 14. (156) Fisher, *53*, **46**: 1250; 14. (157) Flatt, *Diss.*, Zurich, 1923. (158) Foerster, Brosche and Norberg-Schulz, *7*, **110**: 435; 24. (159) Foote, *11*, **29**: 203; 03.
(160) Foote, *11*, **30**: 339; 03. (161) Foote, *7*, **46**: 79; 03. (162) Foote, *11*, **37**: 124; 07. (163) Foote, *1*, **34**: 880; 12. (164) Foote, *45*, **11**: 629; 19. (165) Foote and Andrew, *11*, **34**: 153, 164; 05. (166) de Forcrand, *34*, **149**: 97; 09. (167) de Forcrand, *34*, **149**: 719; 09. (168) de Forcrand, *34*, **149**: 1341; 09. (169) Fraenckel, *93*, **55**: 223; 07.
(170) Franchimont and Backer, *70*, **39**: 751; 20. (171) Freeth, *62*, **223**: 35; 22. (172) Fremy, *6*, **47**: 5; 56. (173) Fujimura, *429*, **1**: 63; 14. (174) Funk, *93*, **20**: 393; 99. (175) Funk, *25*, **33**: 3696; 01. (176) Fürth, *57*, **9**: 308; 88. (177) Fuseya, *1*, **42**: 368; 20. (178) Geffcken, *7*, **49**: 257; 04. (179) Geffcken, *93*, **43**: 197; 05.
(180) Geiger, *Diss.*, Berlin, 1904. (181) Gerardin, *6*, **5**: 129; 65. (182) Gilbert, Buckley and Masson, *4*, **121**: 1934; 22. (183) Giolitti and Bucci, *36*, **35 II**: 152; 05. (184) Giran, *34*, **146**: 1270; 08. (185) Giran, *34*, **157**: 221; 13. (185.5) Gire, *14*, **4**: 183, 370; 25. (186) Glasstone and Saunders, *4*, **123**: 2134; 23. (187) Glauser, *93*, **66**: 437; 10. (188) Goldblum and Terlikowski, *27*, **11**: 103, 146; 12. (189) Goldschmidt, *7*, **17**: 154; 95.
(190) Goldschmidt, *7*, **25**: 91; 98. (191) Goudriaan, *64P*, **22**: 179; 20. (192) Graebe, *25*, **34**: 645; 01. (193) Green, *50*, **12**: 655; 08. (194) Groschuff, *25*, **36**: 1783; 03. (195) Groschuff, *25*, **36**: 4351; 03. (196) Groschuff, *93*, **40**: 1; 04. (197) Groschuff, *93*, **47**: 331; 05. (198) Guntz and Guntz, *6*, **2**: 101; 14. (199) Guthrie, *3*, **49**: 1; 75.
(200) Guthrie, *3*, **49**: 206; 75. (201) Guthrie, *3*, **49**: 266; 75. (202) Guthrie, *3*, **1**: 354; 76. (203) Hall, Robb and Coleman, *Bureau of Mines, Pittsburgh Sta. Report*, No. **593**; 25. (204) Hammick, Goadby and Booth, *4*, **117**: 1589; 20. (205) Hammick and Mullary, *4*, **119**: 1802; 21. (206) Harkins, *1*, **33**: 1807; 11. (207) Harkins and Paine, *1*, **38**: 2709; 16. (208) Harkins and Paine, *1*, **41**: 1155; 19. (209) Harkins and Pearce, *1*, **38**: 2679; 16.
(210) Harkins and Pearce, *1*, **38**: 2714; 16. (211) Harkins and Winninghoff, *1*, **33**: 1827; 11. (212) Hart and Huselton, *1*, **36**: 2082; 14. (213) Hartley and Barret, *4*, **95**: 1178; 09. (214) Hartley, Drugman, Vlieland and Bourdillon, *4*, **103**: 1747; 13. (215) Haslam, Calingaert and Taylor, *1*, **46**: 308; 24. (216) Hecht, *13*, **213**: 65; 82. (217) van der Heide, *7*, **12**: 416; 93. (218) Hendrixson, *1*, **42**: 724; 20. (219) Herold, *9*, **11**: 415; 05.
(220) Herz, *93*, **33**: 355; 03. (221) Herz, *93*, **67**: 365; 10. (222) Herz, *93*, **73**: 274; 12. (223) Herz and Anders, *93*, **52**: 164; 07. (224) Herz and Knoch, *93*, **41**: 315; 04. (225) Herz and Paul, *93*, **82**: 431; 13. (226) Herzfeld, *445*, **47**: 817; 97. (227) Hevesy, Christiansen and Berglund, *93*, **144**: 69; 25. (228) Hill, *1*, **32**: 1186; 10. (229) Hill, *1*, **39**: 218; 17.
(230) Hill, *1*, **43**: 254; 21. (231) Hill, *1*, **44**: 1163; 22. (232) Hill and Simmons, *1*, **31**: 821; 09. *7*, **67**: 594; 09. (233) Hinrichsen and Sachsel, *7*, **50**: 81; 05. (234) van't Hoff, Armstrong, Hinrichsen, Weigert and Just, *7*, **45**: 257; 03. (235) van't Hoff and Goldschmidt, *7*, **17**: 505; 95. (236) van't Hoff and Meyerhoffer, *7*, **27**: 75; 98. (237) van't Hoff, Meyerhoffer and Smith, *76*, **1901 II**: 1034. (238) Hofmann, Höbold and Quoos, *13*, **386**: 304; 12. (239) Horn and van Wagener, *11*, **30**: 344; 03.
(240) Hulett, *7*, **37**: 385; 01. (241) Hulett and Allen, *1*, **24**: 667; 02. (242) Imadsu, *479*, **3**: 247; 12. (243) Inamura, *429*, **4**: 105; 20. (244) Ishikawa, *41*, **43**: 560; 22. (245) Ishikawa and Kimura, *469*, **5**: 1; 26. (246) Iwig and Hecht, *13*, **233**: 166; 86. (247) Jackman and Brown, *4*, **121**: 694; 22. (248) Jäger, *93*, **27**: 22; 01. (249) Jäger and Thomas, *64P*, **21**: 693; 19. (249.5) James, Fogg, McIntire, Evans and Donovan, *1*, **49**: 132; 27.
(250) James and Whittemore, *1*, **34**: 1168; 12. (251) Jellinek, *93*, **70**: 93; 11. (252) Jo, *479*, **3**: 41; 12. (252.5) Johnston, *1*, **37**: 2001; 15. (253) de Jong, *70*, **28**: 342; 09. (254) Joseph, *4*, **117**: 377; 20. (255) Katz and James, *1*, **35**: 872; 13. (256) Ketner, *7*, **39**: 641; 02. (257) King, *Diss.*, Zurich, 1912. (257.5) Kline, *Diss.*, Yale, 1923. (258) Knietsch, *25*, **34**: 4069; 01. (259) Knox and Will, *4*, **115**: 853; 19.
(260) Kohnstamm and Cohen, *8*, **65**: 344; 98. (261) Konovalov, *53*, **31**: 985; 99. (262) Koppel, *93*, **41**: 377; 04. (263) Koppel, *25*, **39**: 3738; 06. (264) Koppel and Blumenthaal, *93*, **53**: 228; 07. (265) Koppel and Cahn, *93*, **60**: 53; 08. (266) Koppel, Wetzel, Gumperz and Koppel, *7*, **52**: 385; 05. (267) Krasnicki, *57*, **8**: 595; 87. (267.5) Kraus, *1*, **49**: 1226; 27. (268) Krauss and Gerlach, *93*, **140**: 61; 24. (269) Kremann, *57*, **32**: 619; 11.
(270) Kremann and Hofmeier, *57*, **29**: 1111; 08. *75*, **117 II b**: 735; 08. (271) Kremann and Hüttinger, *323*, **58**: 637; 09. (272) Kremann and Kerschbaum, *93*, **56**: 218; 08. (273) Kremann and Noss, *57*, **33**: 1205; 12. (274) Kremann and Rodemund, *93*, **86**: 373; 14. (275) Kremers, *8*, **92**: 497; 54. (276) Kremers, *8*, **95**: 468; 55. (277) Kremers, *8*, **97**: 1; 56. (278) Kremers, *8*, **99**: 25; 56. (279) Kremers, *8*, **103**: 57; 58.
(280) Küster and Kremann, *93*, **41**: 1; 04. (281) Küster and Thiel, *93*, **21**: 116; 99. (282) Kuznecov, *53*, **29**: 330; 97. (283) Lagerlotz, *293*, **256**: 123; 18. (284) Lamb and Simmons, *1*, **43**: 2188; 21. (285) Lamy, *6*, **67**: 385; 63. (286) Landau, *57*, **14**: 707; 93. (287) Le Blanc and Schmandt, *7*, **77**: 614; 11. (288) Le Chatelier, *34*, **124**: 1091; 97. (289) Lehrfeld, *Diss.*, Zurich, 1915.
(290) Levi, *36*, **53**: 522; 23. (291) Levi-Malvano, *93*, **48**: 446; 06. (292) Lewis and Brighton, *1*, **39**: 1906; 17. (293) Lewis and Brighton, *1*, **40**: 482; 18. (294) Ley and Schäfer, *25*, **39**: 1259; 06. (295) Lichty, *1*, **25**: 469; 03.

(296) Lidbury, *7*, **39**: 453; 02. (297) Lind, Underwood and Whittemore, *1*, **40**: 465; 18. (298) Loeke, *11*, **26**: 166; 01. (299) Loeke, *11*, **27**: 455; 02.

(300) Loewel, *6*, **33**: 335; 51. (301) Loewel, *6*, **43**: 405; 55. (302) Loewel, *6*, **49**: 32; 57. (303) Lothian, *347*, **30**: 546; 00. (304) Lubarsky, *53*, **28**: 460; 97. (305) Lumsden, *4*, **81**: 350; 02. (306) Maben, *347*, **14**: 505; 84. (307) MeCoy and Test, *1*, **33**: 473; 11. (308) Marden and Rich, *45*, **12**: 651; 20. (309) Marignae, *6*, **39**: 184; 53.

(310) Marino, *36*, **35 II**: 341; 05. (311) Massink, *Diss.*, Leiden, 1913. (312) Masson, *4*, **99**: 1132; 11. (313) Matignon, *34*, **133**: 289; 01. (314) Matignon, *172*, (7th), **2**: 53; 09. (315) Meerburg, *93*, **37**: 199; 03. (316) Meerburg, *93*, **45**: 324; 05. *176*, **1**: 474; 04. (317) Meerburg, *93*, **45**: 1; 05. (318) Meerburg, *Gedenkboek van Bemmelen*, **1910**: 356. (319) Melcher, *1*, **32**: 50; 10.

(320) Menshutkin, *93*, **52**: 152; 07. (321) Menzies and Humphry, *172*, (8th), **2**: 175; 12. (322) Meusser, *25*, **34**: 2432; 01. (323) Meusser, *25*, **35**: 1414; 02. (324) Meusser, *93*, **44**: 79; 05. (325) Meyer and Friedrich, *7*, **102**: 369; 22. (326) Meyerhoffer and Saunders, *7*, **31**: 370; 99. (327) Michel and Kraft, *6*, **41**: 471; 54. (328) Miczynski, *57*, **7**: 255; 86. (329) Middleberg, *7*, **43**: 305; 03.

(330) Milikan, *Diss.*, Leiden, 1914. (331) Millican, Joseph and Lowry, *4*, **121**: 959; 22. (332) Milojkovic, *57*, **14**: 699; 93. (333) Missenden, *135*, **124**: 362; 22. (334) Mohr, *7*, **27**: 193; 98. (335) Moles, University of Madrid, *0*. (336) Moles and Gonzales, *132*, **21**: 204; 23. (337) Moles and Marquina, *132*, **12**: 383; 14. (338) Mondain-Monval, *34*, **174**: 1014; 22. (339) Mondain-Monval, *34*, **175**: 162; 22.

(340) Morgan and James, *1*, **36**: 10; 14. (341) Morse, *7*, **41**: 709; 02. (342) Muir, *4*, **29**: 857; 76. (343) Muir, *135*, **33**: 15; 76. (344) Mulder, *B80*, p. 45, 68. (345) Mulder, *B80*, p. 58. (346) Mulder, *B80*, p. 97. (347) Mulder, *B80*, p. 118. (348) Müller, *7*, **31**: 354; 99. (349) Müller, *Diss.*, Zurich, 1915.

(350) Müller, *1*, **44**: 2493; 22. (351) Müller and Kaufmann, *7*, **42**: 497; 03. (352) Muthmann and Kuntze, *94*, **23**: 368; 94. (353) Muthmann and Rölig, *25*, **31**: 1718; 98. (354) Mylius, *25*, **34**: 2208; 01. (355) Mylius and Dietz, *25*, **34**: 2774; 01. (356) Mylius and Dietz, *93*, **44**: 209; 05. (357) Mylius and Funk, *25*, **30**: 1716; 97. (358) Mylius and Funk, *89*, **3**: 443; 00. (359) Mylius and Funk, *89*, **3**: 449; 00.

(360) Mylius and von Wrochem, *89*, **3**: 459; 00. (361) Nasini and Ageno, *7*, **69**: 482; 08. (362) Naumann and Rücker, *25*, **38**: 2292; 05. (363) Nordenskiöld, *8*, **136**: 309; 69. (364) Noyes, *7*, **6**: 241; 90. (365) Noyes, *7*, **9**: 603; 92. (366) Noyes and Abbot, *7*, **16**: 125; 95. (367) Noyes and Bray, *1*, **33**: 1643; 11. (368) Noyes and Clement, *7*, **13**: 412; 94. (369) Noyes and Kohr, *7*, **42**: 336; 03.

(370) Noyes and Sammet, *7*, **43**: 513; 03. (371) Noyes and Schwartz, *7*, **27**: 279; 98. (372) Oechsner de Coninck, *186*, **1901**: 349. (373) Osaka, *479*, **1**: 265; 08. (374) Osaka, *479*, **1**: 290; 08. (375) Osaka, *479*, **3**: 55; 11. (376) Osaka and Abe, *479*, **3**: 51; 11. (377) Osaka and Hara, *429*, **2**: 147; 17. (378) Osaka and Yoshida, *429*, **6**: 49; 22. (379) Oswald, *6*, **1**: 32; 14.

(380) Pajetta, *36*, **36 II**: 67; 06. (381) Parravano and Fornaini, *36*, **37 II**: 521; 07. (382) Parsons and Corson, *1*, **32**: 1383; 10. (383) Parsons and Whittemore, *1*, **33**: 1933; 11. (384) Partheil and Hübner, *293*, **241**: 412; 03. (385) Pascal and Ero, *27*, **25**: 35; 19. (386) Patrick and Aubert, *Trans. Kansas Acad. Sci.*, **19**: 19; 74. (387) Patterson, *1*, **28**: 1734; 06. (388) Paul, *9*, **23**: 65; 17. (389) Pfaundler and Schnegg, *75*, **71 II**: 351; 75.

(390) Pickering, *4*, **57**: 331; 90. (391) Pickering, *5*, **49**: 11; 91. (392) Pickering, *4*, **63**: 436; 93. (393) Pickering, *4*, **63**: 890; 93. (394) Pickering, *25*, **26**: 277; 93. (395) Pickering, *25*, **26**: 2307; 93. (396) Piña de Rubies, *149*, **38**: 414; 14. (397) Piña de Rubies, *185*, **1**: 521; 15. (398) Poggiale, *6*, **8**: 463; 43. (399) Poggiale, *49*, **44**: 273; 63.

(400) Pohl, *52*, **56**: 210; 52. (401) Polak, *Diss.*, Amsterdam, 1914. (402) Porlezza, *22*, **23 II**: 596; 14. (402.5) Prandtl and Duerue, *93*, **150**: 105; 26. (403) Rabe, *7*, **38**: 175; 01. (404) Ramberg, *93*, **83**: 33; 13. (405) Raupenstrauch, *57*, **6**: 563; 85. (406) Reedy, *1*, **43**: 1440; 21. (407) Reicher and Deventer, *7*, **5**: 559; 90. (408) Reissig, *13*, **127**: 33; 63. (408.5) Remy, *92*, **39**: 1061; 26. (409) Richards, *7*, **26**: 690; 98.

(410) Richards and Churchill, *7*, **28**: 313; 99. (411) Richards and Fraprie, *11*, **26**: 75; 01. (412) Richards and Kelley, *1*, **33**: 847; 11. (413) Rimbach and Korten, *93*, **52**: 406; 07. (414) Richards and Schumb, *93*, **40**: 1403; 18. (415) Richards and Wells, *7*, **43**: 465; 03. (416) Richards and Wrede, *7*, **61**: 313; 08. (417) Richards and Yngve, *1*, **40**: 89; 18. (418) Richards and Yngve, *1*, **40**: 164; 18. (419) Riedel, *7*, **56**: 243; 06.

(420) Riesenfeld and Feld, *93*, **116**: 213; 21. (421) Rimbach, *25*, **30**: 3073; 97. (422) Rimbach, *25*, **38**: 1553; 05. (423) Rimbach and Schubert, *7*, **67**: 183; 09. (424) Rivett, *4*, **121**: 379; 22. (425) Rivett and Clendinnen, *4*, **123**: 1634; 23. (426) Rodebush, *1*, **40**: 1204; 18. (427) Roelofsen, *11*, **16**: 464; 94. (428) Rogowicz, *445*, **55**: 938; 05. (429) Rosenbladt, *25*, **19**: 2535; 86.

(430) Rosenheim and Grünbaum, *93*, **61**: 187; 09. (431) Rosenheim and Krause, *93*, **118**: 177; 21. (432) Rosenheim and Reglin, *93*, **120**: 103; 21. (433) Rosenheim and Weinheber, *93*, **69**: 261; 11. (434) Rosenstiehl and Rühlmann, *Bull. soc. ind. Mulhouse*, **40**: 153; 70. (435) Ross and Jones, *1*, **47**: 2165; 25. (436) Rothmund, *7*, **69**: 523; 09. (437) Rudorff, *25*, **2**: 68; 69. (438) and (439) Rupert, *1*, **31**: 851; 09.

(440) Salkowski, *25*, **34**: 1947; 01. (441) Sborgi and Franco, *36*, **51 II**: 1; 21 (442) Scheele, *93*, **18**: 352; 98. (443) Scheffer, *64P*, **18**: 446; 16. (444) Scheibler, *49*, **8**: 540; 83. (445) Schiavon, *36*, **32 II**: 532; 02. (446) Schiek, *7*, **42**: 155; 03. (447) Schiff, *13*, **109**: 325; 59. (448) Schiff, *13*, **113**: 349; 60. (448.5) Schloesing, *34*, **74**: 1552; 72. (449) Schreinemakers, *7*, **55**: 71; 06.

(450) Schreinemakers, *7*, **66**: 687; 09. (451) Schreinemakers, *7*, **69**: 557; 09. (452) Schreinemakers, *7*, **71**: 109; 10. (453) Schreinemakers, *18*, **15**: 488; 11. (454) Schreinemakers and de Baat, *18*, **15**: 80; 10. (455) Schreinemakers and de Baat, *18*, **15**: 411; 11. (456) Schreinemakers and Prooije, *64P*, **15**: 1326; 13. (457) Schreinemakers and Thonus, *64V*, **21**: 332; 12. (458) Sedlitzky, *57*, **8**: 563; 87. (459) Setterberg, *13*, **211**: 100; 82.

(460) Seubert and Eltern, *93*, **2**: 434; 92. (461) Sherrill, *7*, **43**: 705; 03. (462) Shiomi, *479*, **1**: 406; 08. (463) Sidgwick and Ewbank, *4*, **121**: 1844; 22. (464) Sidgwick and Gentle, *4*, **121**: 1837; 22. (465) Sill, *1*, **38**: 2632; 16. (466) Smith, *1*, **31**: 245; 09. (467) Smith and Ball, *1*, **39**: 217; 17. (468) Smith and Eastlack, *1*, **38**: 1261; 16. (469) Smith and Eastlack, *1*, **38**: 1500; 16.

(470) Smith and Menzies, *1*, **31**: 1183; 09. (471) Sommer, *93*, **86**: 71; 14. (472) Sommer and Weise, *93*, **94**: 51; 16. (473) Souchay and Lenssen, *13*, **99**: 31; 56. (474) Stanbridge, *4*, **113**: 808; 18. (475) Starck, *93*, **70**: 173; 11. (476) Steele and Johnson, *4*, **85**: 113; 04. (477) von Steinwehr, *8*, **9**: 1046; 02. (478) Stiassny, *57*, **12**: 589; 91. (479) Stoltzenberg, *202*, **92**: 445; 14.

(480) Stortenbeker, *7*, **22**: 60; 97. (481) Süss, *94*, **51**: 248; 12. (482) Takegami, *429*, **4**: 317; 21. (483) Takeuchi, *429*, **1**: 249; 16. (484) Tarugi and Checchi, *36*, **31 II**: 417; 01. (485) Taylor, *50*, **1**: 718; 97. (486) Taylor, *68*, **22**: 248; 98. (487) Taylor and Henderson, *1*, **37**: 1688; 15. (488) Terres and Brückner, *9*, **26**: 1; 20. (489) Terres and Brückner, *9*, **26**: 25; 20.

(490) Terres and Weiser, *9*, **27**: 177; 21. (491) Terrey and Jolly, *4*, **123**: 2217; 23. (492) Thilo, *136*, **16**: 1688; 92. (493) Thin and Cumming, *4*, **107**: 361; 15. (494) Tilden, *4*, **45**: 266; 84. (495) Tilden and Shenstone, *5*, **35**: 345; 83. *62*, **175**: 23; 85. (496) Tobler, *13*, **95**: 193; 55. (497) Toda, *429*, **4**: 305; 21. (498) Toda, *429*, **4**: 377; 21. (499) Tomula, *93*, **118**: 81; 21.

(500) Toporescu, *34*, **174**: 870; 22. (501) Toporescu, *34*, **175**: 268; 22. (502) Tourneux, *6*, **11**: 334; 19. (503) Trautz and Anschütz, *7*, **56**: 236; 06. (504) Trevor, *7*, **7**: 468; 91. (505) Trimble, *1*, **44**: 451; 21. (506) Tutton, *4*, **71**: 850; 97. (507) Tutton, *5*, **79**: 351; 07. (508) Vallance, *135*, **125**: 7; 22. (509) Vasil'ev, *53*, **42**: 570; 10.

(510) Vesterberg, *19*, **6**: No. 11: 18; 17. (511) Voermann, *176*, **2**: 766; 05. (512) Voermann, *176*, **3**: 784, 806; 06. (513) de Waal, *Diss.*, Rotterdam, 1910. (514) Wagner, *7*, **71**: 401; 10. (515) Walden, *7*, **55**: 683; 06. (516) Walker and Fyffe, *4*, **83**: 173; 03. (517) Wallace, *4*, **7**: 77; 55. (518) von Wartenberg, *13*, **440**: 97; 24. (518.5) Wells, *128*, **5**: 617; 15. (519) Wells and McAdam, *1*, **29**: 721; 07.

(520) Werner, *13*, **386**: 1; 11. (521) Werner, *25*, **44**: 2445; 11. (522) Weston, *4*, **121**: 1223; 22. (523) Whitby, *93*, **67**: 62, 107; 10. (524) Williams, Fogg and James, *1*, **47**: 297; 25. (525) Wing and Thompson, *1*, **48**: 104; 26. (526) Wirth, *93*, **76**: 174; 12. (527) Wirth, *93*, **79**: 357; 13. (528) Wirth, *93*, **87**: 9; 14. (529) Wöhler and Krupko, *25*, **46**: 2045; 13.

(530) Wolff, *93*, **45**: 89; 05. (531) van Wyk, *93*, **48**: 1; 06. (532) Young, *1*, **19** 845; 97. (533) Young and Burke, *1*, **26**: 1413; 04. (534) Young and Burke, *1*, **28**: 315; 06. (535) Zocher, *93*, **112**: 1; 20. (536) Chamberlain, Hume, Bryan and Topley, *4*, **1926**: 2620. (537) Packer and Rivett, *4*, **1926**: 1061. (538) Voskressenska, *93*, **155**: 115; 26. (539) Guigues, *345*, **34**: 210; 27.

(540) Scott and Frazier, *50*, **31**: 459; 27.

SOLUBILITY OF ORGANIC SUBSTANCES AND OF WEAK ELECTROLYTES IN WATER

Nelson W. Taylor

INTRODUCTION

Throughout this section the solid phase is the unhydrated solute except where otherwise indicated.

Symbols

x Mole fraction of the unhydrated solute
S Grams solute per 100 g of water
T Absolute temperature, $T = 273.1 + t$
A Molal heat of solution in joules
B A numerical constant
C $\dfrac{\text{Molecular weight of solute}}{\text{Molecular weight of water}} \times \dfrac{100}{\text{n}}$
n Number of moles solute formed in solution from 1 M of the solid solute; n is usually equal to 1, but in the case of As_2O_3, for example, n = 2 because As_2O_3 + water = $2H_3AsO_3$.

For other symbols and abbreviations, *v.* p. 4.

Melting points are given in bold-face figures.

The data are presented either in the form of the constants A and B of the equation

$$\log_{10}\frac{1}{x} = \frac{0.05223\text{A}}{T} + \text{B} \qquad (1)$$

or tabulated values of S for various temperatures.

INTRODUCTION

Dans cette section la phase solide est le corps dissout non hydraté à moins d'une autre indication.

Symboles

x Fraction moléculaire du corps dissout non hydraté
S Grammes de corps dissout dans 100 g d'eau
T Température absolue, $T = 273{,}1 + t$
A Chaleur moléculaire de dissolution en joules
B Une constante numérique
C $\dfrac{\text{Poids moléculaire du corps dissout}}{\text{Poids moléculaire de l'eau}} \times \dfrac{100}{\text{n}}$
n Nombre des molécules du corps dissout formées par la dissolution d'une molécule de corps solide; n est ordinairement égal à 1, mais dans le cas de As_2O_3, par exemple, n = 2 car As_2O_3 + eau = $2H_3AsO_3$.

Pour les autres symboles et abréviations, *v.* p. 4.

Les points de fusion sont donnés en caractères gras.

Les données sont exprimées ou sous la forme des constantes A et B de l'équation

$$\log_{10}\frac{1}{x} = \frac{0{,}05223\text{A}}{T} + \text{B} \qquad (1)$$

ou par les valeurs de S disposées en tableau pour des températures variées.

EINLEITUNG

In diesem ganzen Abschnitt ist als feste Phase der wasserfreie Stoff verstanden, wenn nichts anderes bemerkt wird.

Zeichen

x Molenbruch des gelösten wasserfreien Stoffes
S Gramme des gelösten Stoffes auf 100 g Wasser
T Absolute Temperatur, $T = 273{,}1 + t$
A Lösungswärme in Joule pro Mole
B Eine numerische Konstante
C $\dfrac{\text{Molekulargewicht des gelösten Stoffes}}{\text{Molekulargewicht des Wassers}} \times \dfrac{100}{\text{n}}$
n Molzahl des gelösten Stoffes, die sich aus einem Mol des löslichen Stoffes (der festen Phase) bilden. Es ist n gewöhnlich Eins, aber im Falle des As_2O_3 ist sie z. B. n = 2, weil $As_2O_3 + H_2O \rightarrow 2H_3AsO_3$ gibt.

Für andere Zeichen und Abkürzungen, *siehe* S. 4.

Schmelzpunkte sind durch hervorgehobene Schrift gekennzeichnet.

Die Werte sind entweder durch die Konstanten A und B der Gleichung

$$\log_{10}\frac{1}{x} = \frac{0{,}05223\text{A}}{T} + \text{B}$$

dargestellt, oder durch die tabellarische Anordnung der Werte für S bei verschiedenen Temperaturen.

INTRODUZIONE

In tutto questo capitolo la fase solida è sempre la sostanza disciolta anidra, tranne che non sia indicato altrimenti.

Simboli

x Frazione di grammimolecola della sostanza disciolta anidra
S Grammi di sostanza disciolta in 100 g di acqua
T Temperatura assoluta, $T = 273{,}1 + t$
A Calore molecolare di soluzione in joule
B Costante numerica
C $\dfrac{\text{Peso molecolare della sostanza disciolta}}{\text{Peso molecolare dell'acqua}} \times \dfrac{100}{\text{n}}$
n Numero di grammimolecole di soluto formatesi in soluzione da 1 grammimolecola di sostanza solida; n è in generale eguale ad 1, tranne ad es. casi come quelli di As_2O_3, dove n = 2 perchè As_2O_3 + acqua = $2H_3AsO_3$.

Per altri simboli ed abbreviazioni, *vedi* p. 4.

I punti di fusione sono stampati in grassetto.

I dati sono riportati, o sotto forma delle costanti A e B dell' equazione:

$$\log_{10}\frac{1}{x} = \frac{0{,}05223\text{A}}{T} + \text{B} \qquad (1)$$

oppure sotto forma di tabelle con i valori di S, per diverse temperature.

To find S for any temperature within the range covered by equation (1) first compute $1/x$ from that equation and then find

$$S = \frac{\text{C}}{1/x - 1} \qquad (2)$$

using the value of C given in the table.

Example: To find the solubility of *p*-nitrophenol at 60°,

$$\log_{10}\frac{1}{x} = \frac{0.05223 \times 16410}{273.1 + 60} - 2.186. \quad \frac{1}{x} = 2.43_8$$

$$S = \frac{772}{2.43_8 - 1} = 537 \text{ g per } 100 \text{ g } H_2O$$

In this section no A and B values are given in those cases where the experimental data could not be represented by equation (1). In such cases typical S values are listed for various centigrade temperatures, t.

The accuracy of the data is indicated by the number of significant figures.

For solubility of alkaloids, certain organic acids and certain substituted phenols, *see* the tables at the end of this section.

Experimental results which were found to be too incomplete to be incorporated here can usually be found by reference to:

Seidell, "Solubilities of Inorganic and Organic Substances," New York, Van Nostrand, 1919.

Comey and Hahn, "A Dictionary of Chemical Solubilities," New York, Macmillan Co., 1921.

"Tables Annuelles Internationales de Constantes et Données Numériques," Paris, Gauthier-Villars, 1910–

TABLE 1

Additional data for those compounds which are starred may be found in Table 2

Formula	Name	Range	A	B	C	Lit.
$SeO_2.H_2O$		−21 to 65	7 106	−0.734	617.1	(44)
As_2O_3*		0 to 100	16 470	−0.473	549.3	(1)
H_3BO_3*		0 to 75	2 125	−1.945	343.2	(48); *cf.* (26)
CH_2O_2	Formic acid	7.00 to 8.39	12 090	−2.243	255.3	(5)
		8.39 to 15.72	12 670	−2.352	255.3	(18)
CH_3NO	Formamide	−45 to 2.2	9 150	−1.735	250	(17)
$C_2H_4N_4$	Dicyanodiamide*	0 to 75	31 540	−3.455	466.6	(28)
$C_2H_4O_2$	Acetic acid*	−27 to 10	14 980	−2.70	333.2	(50); *cf.* (59)
C_2H_5NO	Acetamide	0 to 60	11 970	−1.756	327.8	(47); *cf.* (13, 73)
$C_3H_4O_4$	Malonic acid*	0 to 50	9 310	−0.979	577	(36, 63)
$C_3H_8O_3$	Glycerol*	18 to −1.3	17 150	−3.078	511	(57)
$C_4H_6O_4$	Succinic acid	0 to 75	32 380	−3.778	655.1	(45)
$C_4H_{10}O_4$	Erythritol	116.6 to 87.8	35 050	−4.692	677	(57)
		82.0 to 4	20 700	−2.625	677	(57)
$C_5H_4N_4O_3$	Uric acid*	15 to 100	26 200	+0.502	933	(6)
C_6H_5ClO	*m*-Chlorophenol*	32.5 to 10.8	16 220	−2.778	712.5	(72)
$C_6H_5NO_3$	*p*-Nitrophenol*	50 to 90	16 410	−2.186	772	(71)
$C_6H_6O_2$	Resorcinol	0 to 100	18 340	−2.478	611	(47); *cf.* (73)
$C_6H_{10}O_4$	Dimethyl succinate*	18.1 to 19.5	25 200	−4.49	811	(11, 12)
$C_6H_{12}O_6$	α-Dextrose*	50 to 90	18 490	−2.204	1 100	(34)
$C_6H_{14}O_2$	Pinacone	29.4 to 41.1	14 260	−2.369	655.5	(57)
$C_6H_{14}O_6$	Mannitol*	40 to 100	2 142	−2.102	1 011	(19)
$C_7H_5NO_4$	*o*-Nitrobenzoic acid*	148 to 90.6	26 800	−3.322	929.0	(68); *cf.* (20)
$C_7H_5NO_4$	*p*-Nitrobenzoic acid*	237.0 to 174.4	44 280	−4.538	929	(20); *cf.* (68)
C_7H_8O	*p*-Cresol*	20 to 34	12 380	−2.106	599.8	(71)
C_7H_9N	*p*-Toluidine	41.0 to 43.4	21 200	−3.50	594.5	(11, 12)
$C_8H_6O_3$	*o*-Aldehydobenzoic acid*	100.5 to 58.1	24 560	−3.435	832	(67)
$C_8H_6O_3$	*m*-Aldehydobenzoic acid*	175 to 121	37 420	−4.36	832	(67)
C_8H_8ClNO	*p*-Chloroacetanilide*	65 to 140	46 780	−3.220	941.0	(70)
$C_8H_{10}N_4O_2.H_2O$	Caffeine	0 to 80	34 900	−3.42	1 077	(80); *cf.* (39)

TABLE 2

Additional data for those compounds which are starred may be found in Table 1

H_2O_2 (42)

C = 1885

t	*S*
−54.5	142.8
−50.0	170.6
−32.2	284.5
− 4	2960

NH_3 (54); *cf.* (16, 60)

C = 94.5

v. also p. 217

t	*S*
−92.5E	419
−87.2	605
−83.7	890
−80.9	1690
−77.6	∞

As_2O_3* (1)

C = 549.3

t	*S*
0	1.21
25	2.05
98.5	8.18

H_3BO_3* (48); *cf.* (26)

C = 343.2

v. also p. 226

H_3BO_3.—(*Cont'd*)

t	*S*
99.5	29.08
108	58.0
115	81.8
120	110

𝕮-Table, the 𝕮-arrangement

CH_2N_2 (55)

Cyanamide

C = 233

t	*S*
−16.6E	60.5
+42.9	∞

CH_4N_2O (53, 73); *cf.* (51)

Urea

C = 333

t	*S*
0	67.1
19.8	97.8
31.7	131.3
69.5	252.5

CH_4N_2S (35)

Thiourea

C = 423

CH_4N_2S.—(*Cont'd*)

t	*S*
56.5	64.4
97.2	239
120.6	485
145.0	1160

CH_4O (5)

C = 177.6

t	*S*
−139E	360
− 95.7	∞

$C_2H_2O_4$ (38); *cf.* (25, 77)

Oxalic acid

C = 499.7

$C_2H_2O_4.2H_2O$

t	*S*
0	3.522
20	9.52
40	21.51
60	61.07

$C_2H_3Cl_3O_2$ (73)

Chloral hydrate

C = 918.1

t	*S*
0	189.7
15	330.0
30	480.0
35	516.0

$C_2H_4N_4$* (28)

Dicyanodiamide

t	*S*
C = 466.6	
25	4.13
49.8	11.80

$C_2H_4O_2$* (50); *cf.* (59)

Acetic acid

C = 333.2

t	*S*
3.34	943
16.02	∞

C_2H_6O (56)

Ethyl alcohol

C = 255.5

t	*S*
−118.4E	1445
−110.5	∞

$C_3HCl_3O_2$ (7)

Trichloroacrylic acid

C = 974

t	*S*
17E†	430
72.9	∞

† $C_3HCl_3O_2$ + $C_3HCl_3O_2.2\frac{1}{2}H_2O$.

$C_3H_4O_4$* (36, 63)

Malonic acid

C = 577

t	*S*
100	810

$C_3H_8O_3$* (40)

Glycerol

$C_3H_8O_3$.—(*Cont'd*)

C = 511

t	*S*
−46.5E	200
−37.5	244
−22.0	376
− 1.0	931
+ 7.5	2028
13.5	5455
17.9	∞

$C_4H_4O_4$ (76)

Fumaric acid

C = 650

t	*S*
25	0.70
40	1.07
60	2.4
100	9.8

$C_4H_4O_4$ (76)

Maleic acid

C = 650

t	*S*
25	78.8
40	112.5
60	148.7
97.5	392.6

$C_4H_5NO_2$ (73)

Succinimide

C = 650

t	*S*
0	10.3
20	26
30	52

$C_4H_5NO_2$.—(*Cont'd*)

t	*S*
50	116
80	213

$C_4H_6O_4$ (11, 12)

Dimethyl oxalate

C = 655

t	*S*
38.27	5 490
39.34	11 400
40.05	26 900

$C_4H_6O_5$ (76)

dl-Malic acid

C = 749

t	*S*
26	144.8
50	222.0
70	332.0
79	411.5

$C_4H_6O_6$ (41)

d(l)-Tartaric acid

C = 832

t	*S*
10	126
30	156
50	192
80	270

dl-Tartaric acid (41)

C = 832.8

t	*S*
20	18.0
40	37.0
70	80.6
100	137.8

$C_4H_8N_2O_3$ (10)
β-l-Asparagine
C = 744.4

t	S
$C_4H_8N_2O_3.H_2O$	
7.9	1.426
28	3.171
41.4	5.650
71.7	19.84
98	52.48

$C_5H_4N_4O_3$* (6)
Uric acid
C = 933

0.0	0.002

$C_6H_4N_2O_5$ (64)
2, 3-Dinitrophenol
C = 1021

96.0	289
112.3	885
145.1	∞

2, 5-Dinitrophenol
C = 1021

98.0	3900
100.0	6470
105.6	∞

3, 4-Dinitrophenol
C = 1021

53.0	298.2
84.5	850.0
134.7	∞

C_6H_5ClO (72)
o-Chlorophenol
C = 712.5

−8.2	1182
−6.0	1548
−1.5	3015
+2.0	6105
7.0	∞

m-Chlorophenol*
C = 712.5

3.2	560.5
4.5	680

p-Chlorophenol
C = 712.5

0.5	802
11.0	1711
18.0	3043
41.0	∞

$C_6H_5NO_3$* (71)
p-Nitrophenol
C = 772

42.3	314.2
43.9	383
62.0	890
113.9	∞

$C_6H_6N_2O_2$ (70)
p-Nitroaniline
C = 766

128.0	1529
136.8	2660
144.8	9500
147.0	∞

C_6H_6O (58); cf. (30)
Phenol
C = 521

t	S
3.3	3230
15.8	1110
16.2	1150
29.3	1900

C_6H_7N (2); cf. (3, 29)
Aniline
C = 516.7

−11.85E	3 783
− 8.40	11 690
− 7.55	20 350
− 7.05	23 010
− 5.98	∞

C_6H_7NO (66)
o-Aminophenol
C = 605

100.2	7.65
135.8	229.2
143.0	411
155.6	950

m-Aminophenol
C = 605

66.4	44.2
70.2	88.5
73.2	145.4
96.0	792

p-Aminophenol
C = 605

102.0	50.2
106.5	103.3
116.5	232.5
145.8	849

$C_6H_7NO_3S$ (52)
Sulfanilic acid
C = 961

$C_6H_7NO_3S.2H_2O$	
0	0.446
13.3	0.848
25.1	1.402
47.5	2.585
$C_6H_7NO_3S.2H_2O$ + $C_6H_7NO_3S.H_2O$	
18.9	1.126
$C_6H_7NO_3S.H_2O$ + $C_6H_7NO_3S$	
44.0	2.46

$C_6H_8N_2$ (69)
o-Phenylenediamine
C = 600

67.7	167
80.8	758
88.1	1520
95.5	4285

m-Phenylenediamine (α-form) (69)

$C_6H_8N_2$.—(Cont'd)
C = 600

t	S
22.7	229
28.7	379
43.5	1201
57.6	6145

p-Phenylenediamine (69)
C = 600

75.5	107.3
88.5	234
107	648
125.1	1915

$C_6H_8N_2$ (49)
Phenylhydrazine
C = 600

16.00	5550
16.42	8660
19.35	∞

$C_6H_{10}O_4$* (11, 12)
Dimethyl succinate
C = 811

15.87	4 690
16.82	7 510
17.57	11 820
18.02	16 400

$C_6H_{12}O_6$* (34)
α-Dextrose†
C = 1100

α-$C_6H_{12}O_6.H_2O$	
0.50	54.3
15	81.68
35	138.2
45	191.6
α-$C_6H_{12}O_6.H_2O$ (23)	
15.00	81.68
22.98	97.51
50.00	243.76
α-$C_6H_{12}O_6$‡	
70.2	359.35
90.8	562.25

† S = g $C_6H_{12}O_6$/100g H_2O.
‡ C = 1000.

$C_6H_{14}O_6$* (9, 19)
Mannitol
C = 1011

− 1.019E	9.942
0.00	10.36
+10.00	13.7
20.00	18.6
30.00	25.2
50.00	47.6
80.00	115.0
100.00	197.0

$C_7H_5NO_4$ (68); cf. (20)
o-Nitrobenzoic acid*
C = 929.0

49.5	1.88
75.3	10.48
78.0	66.5
79.5	149.0
146.8	∞

$C_7H_5NO_4$.—(Cont'd)
m-Nitrobenzoic acid (20); cf. (68)
C = 929

t	S
77.6	134.7
80.2	290.5
141.4	∞

p-Nitrobenzoic acid* (20); cf. (68)
C = 929

143.0	5.26
151.4	11.1
162.6	65.8
167.4	150.0
242.4	∞

$C_7H_5N_3O_6$ (75)
2, 4, 6-Trinitrotoluene
C = 1260

0	0.0100
15	0.0120
30	0.0175
60	0.0675
100	0.1475

$C_7H_5N_5O_8$ (75.5)
2, 4, 6-Trinitrophenylmethylnitroamine (tetryl)
C = 1592

0	0.0050
30	0.0085
45	0.0140
60	0.0350
100	0.1842

$C_7H_6O_2$ (65)
m-Hydroxybenzaldehyde
C = 678

43	2.84
60.4	186.5
71.2	499
81.1	808

p-Hydroxybenzaldehyde (65)
C = 678

63.0	99
64.1	150
69.3	327
83.6	792

$C_7H_6O_2$ (68); cf. (8)
Benzoic acid
C = 678

98.0	426
103.5	844
122.7	∞

$C_7H_6O_3$ (68); cf. (61)
o-Hydroxybenzoic acid
C = 767

50.0	0.561
101.4	8.72
109.5	189.0
159.0	∞

$C_7H_6O_3$.—(Cont'd)
m-Hydroxybenzoic acid (68)
C = 767

t	S
69.0	6.51
84.6	17.23
98.3	51.2
134.0	242.5
201.3	∞

p-Hydroxybenzoic acid (68); cf. (20)
C = 767

56.0	3.31
80.1	13.43
114.0	108.2
213.0	∞

$C_7H_7NO_2$ (20)
o-Aminobenzoic acid
C = 760.5

105.0	97.5
107.8	230
116.2	681
128.4	1900
144.6	∞

m-Aminobenzoic acid
C = 760.5

77.8	4.83
109.2	24.8
116.5	64.7
123.2	157.8
143.0	599.0
174.4	∞

p-Aminobenzoic acid
C = 760.5

82.2	5.26
94.0	11.1
109.0	42.8
123.4	214.3
144.8	733.5
186.0	∞

C_7H_8O (71)
o-Cresol
C = 599.8

8.3	702
10.2	889
12.9	1255
22.3	3838
29.9	∞

p-Cresol*
C = 599.8

8.7	661.0
10.8	909.1

$C_8H_6O_3$ (67)
o-Aldehydobenzoic acid*
C = 832

46.1	10.3
49.9	41.2

$C_8H_6O_3$.—(Cont'd)
m-Aldehydobenzoic acid*
C = 832

t	S
99.7	5.19
110.7	24.75
113.5	67.4
116.6	143.0

p-Aldehydobenzoic acid
C = 832

142.3	11.4
150.9	23.6
158.9	48.0
181.5	98.5
191.5	385.0
250	∞

$C_8H_6O_4$ (43, 74)
Phthalic acid
C = 922

25	0.7064
45	1.467
65	3.355
85	8.327
95	21.95

C_8H_8ClNO (70)
o-Chloroacetanilide
C = 941.0

73.0	1880
77.0	3790
82.0	8980
86.7	∞

m-Chloroacetanilide
C = 941.0

64.0	3040
69.0	4900
76.6	∞

p-Chloroacetanilide*
C = 941.0

168	3717

$C_8H_8N_2O_3$ (70)
p-Nitroacetanilide
C = 1000

163.6	450
192.2	1980
215.9	∞

$C_8H_8O_2$ (65)
2-Hydroxytoluene-4-aldehyde
C = 755

69.2	104
69.4	147
69.9	228
75.9	478

6-Hydroxytoluene-3-aldehyde
C = 755

79.6	149.2
80.3	274
91.2	656
117.4	∞

$C_8H_8O_2$ (71)
o-Toluic acid
C = 755

t	*S*
93.7	1146
94.4	1520
96.0	2370
102.4	∞

m-Toluic acid
C = 755

t	*S*
94.2	1225
101.9	3160
110.5	∞

p-Toluic acid
C = 755

t	*S*
145.1	392.5
156.5	1235
176.8	∞

$C_8H_8O_3$ (68)
3-Hydroxytoluene-2-carboxylic acid
C = 845

t	*S*
129.8	228.0
134.5	412.3
147.5	914.5
167.0	∞

4-Hydroxytoluene-2-carboxylic acid
C = 845

t	*S*
103.4	6.13
118.8	52.25
132.4	530.5
172.4	∞

4-Hydroxytoluene-3-carboxylic acid
C = 845

t	*S*
109.5	336.0
112.0	392.0
126.4	872.0
152.5	∞

5-Hydroxytoluene-3-carboxylic acid
C = 845

t	*S*
98.8	4.20
124.2	43.4
143.0	195.0
208.5	∞

$C_8H_8O_3$.—(*Cont'd*)
3-Hydroxytoluene-4-carboxylic acid
C = 845

t	*S*
132.6	209.7
138.3	392.6
147.8	869
177.8	∞

$C_8H_{10}N_2O$ (69)
N-Acetyl-*o*-phenylenediamine
C = 834

t	*S*
59.1	107.1
78.2	253.6
99	604
115.4	1376

N-Acetyl-*m*-phenylenediamine
C = 834

t	*S*
144.2	114.1
167.0	246
204.4	653
235.8	1610

N-Acetyl-*p*-phenylenediamine
C = 834

t	*S*
98.6	96.5
107.1	226
119.2	447
144.0	1610

$C_8H_{10}O_2$ (11, 12)
Veratrol
C = 766

t	*S*
20.12	8 910
20.91	16 120
21.25	22 180

$C_9H_{13}O_2P$ (15)
Mesitylene phosphinous acid (mesityl dihydroxyphosphine)
C = 1022

t	*S*
1	0.290
25	0.300
35	0.325
45	0.387
65	0.528
85	0.704

$C_{10}H_{12}AsNO_7$ (79)
$C_4H_4O_6(AsOH)$-$C_6H_5NH_2$
C = 1850

t	*S*
15	41.84
20	47.73
35	118.18
100	733.0

$C_{10}H_{12}NO_7Sb$ (78)
$C_4H_4O_6(SbOH)$-$C_6H_5NH_2$
C = 2100

t	*S*
15	16.59
20	18.10
35	24.39
100	201.8

$C_{10}H_{14}O$ (62)
Thymol
C = 834

t	*S*
10	0.067
20	0.088
35	0.126
40	0.141

$C_{12}H_{22}O_{11}$
Sucrose, *v.* Vol. II, p. 344

$C_{12}H_{22}O_{11}.H_2O$ (22); *cf.* (31, 32, 33)
Lactose
C = 2000
β-$C_{12}H_{22}O_{11}.H_2O$

t	*S*
0	12.47
39	33.0
89	146.0

α-$C_{12}H_{22}O_{11}$†

t	*S*
121.5	226.5
146.2	366.0
178.8	652.5

† C = 1900.

$C_{12}H_{22}O_{11}$ (24)
Maltose
C = 1900

t	*S*
0.6	56.5
29.6	93.2
54.2	151.4
74.2	261.5
96.5	569.3

Substituted Phenols in Water at 25°C

Solid phase	Equiv. per l
Catechol	4.19
β-Naphthol	0.00524
p-Nitrophenol	0.1097
m-Nitrophenol	0.0974
Pyrogallol	4.02
Quinol	0.666
Resorcinol	6.515

Alkaloids in Water at 20°C

Dissolved substance	Grams of anhydrous base dissolved by 100 cm³ of H_2O
Atropine	0.1338
Brucine	0.0553
Quinine	0.0453
Cocaine	0.0278
Codeine	0.7893
Caffeine	1.462
Coniine	1.8280
Dionine	0.2613
Eucaine-β	0.2964
Morphine	0.02015
Narcotine	0.00445
Novocaine	0.3325
Strychnine	0.01253
Veratrine	0.1136

Organic Acids in Water at 25°C

Solid phase	Equiv. per l
Benzilic acid	0.00769
Cinnamic acid	0.00385
Citric acid	12.54
3, 5-Dinitrobenzoic acid	0.00635
Diphenylacetic acid	0.00060
Diphenic acid	0.00520
Diphenyleneglycollic acid	0.01082
Malonic acid	15.01
Mandelic acid	1.191
m-Nitrobenzoic acid	0.0214
o-Nitrobenzoic acid	0.0470
Oxalic acid	2.409
Phenylacetic acid	0.1310
Phthalic acid	0.0852
Picric acid	0.0578
Salicylic acid	0.01613
Styphnic acid	0.02179
Suberic acid	0.0680
Succinic acid	1.352
Tartaric acid	10.26
Trichlorolactic acid	4.024

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(For a key to the periodicals see end of volume)

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FREEZING-POINT LOWERINGS OF AQUEOUS SOLUTIONS

R. E. Hall and Miles S. Sherrill

Symbols

N_w (resp. N_v) Number of gram-formula weights of solute per 1000 g of H_2O (resp. per liter of solution)

Δt Freezing-point lowering in °C

$\frac{\Delta t}{N}$ $\frac{\Delta t}{N_w}$ or $\frac{\Delta t}{N_v}$ = the molal freezing-point lowering

Symboles

N_w (resp. N_v) Nombre de molécule-grammes du corps dissout dans 1000 g d'eau (resp. dans un litre de solution)

Δt Abaissement du point de congélation en °C

$\frac{\Delta t}{N}$ $\frac{\Delta t}{N_w}$ ou $\frac{\Delta t}{N_v}$ = abaissement moléculaire du point de congélation

Zeichen

N_w (bezw. N_v) Zahl der Grammformel-Gewichte des gelösten Stoffes auf 1000 g Wasser (bezw. auf 1 Liter der Lösung)

Δt Schmelzpunktserniedrigung in °C

$\frac{\Delta t}{N}$ $\frac{\Delta t}{N_w}$ oder $\frac{\Delta t}{N_v}$ = Molekulare-Schmelzpunktserniedrigung

Simboli

N_w (resp. N_v) Numero dei pesi corrispondenti alle formule espresse in grammi di sostanza disciolta per 1000 g di H_2O (o per litro di soluzione)

Δt Abbassamento del punto di congelamento in °C

$\frac{\Delta t}{N}$ $\frac{\Delta t}{N_w}$ o $\frac{\Delta t}{N_v}$ = abbassamento molecolare del punto di congelamento

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R. E. Hall

Figures having a relative significance only, are given in small type.

Solutions of One Solute

A-B-Table

Standard arrangement (*v*. Vol. III, p. viii)

O_2*: Δt = 0.004° (227)

* This reference does not specify pressure, although it approximated barometric pressure.

H_2O_2 (164, 172, 192)

N_w	$\Delta t/N$
0.037	1.9
.07	1.86
.10	1.84
.20	1.84
.50	1.86
1.0	1.88
2.0	1.91
5.0	1.96
10.0	2.03
20.0	2.16
24.05E*	2.22

* Ice + $H_2O_2.2H_2O$ (extrap.)

HF (5, 137, 200)

N_w	$\Delta t/N$
0.025	2.20
.04	2.11
.07	2.02
0.10	1.98
.20	1.91
.40	1.89
.70	1.90
1.0	1.93
2.0	2.03
4.0	2.18

Cl_2 (246)

N_w	$\Delta t/N$
0.01	4.0
.015	3.926
.02	3.816
.03	3.563
.05	3.145
.08	2.85
.069E*	2.91

* Ice + $Cl_2.8H_2O$. N_w is taken from Roozeboom (9); his value for $\Delta t/N$ is 3.48, which does not agree with the accurate temperature measurements of Roth.

ClO_2 (29)

N_v	$\Delta t/N$
0.076	2.3
to	to
0.405	1.98
0.4E*	1.98

* Ice + $ClO_2.8H_2O \pm 1H_2O$.

HCl (160, 215, 224, 236)

N_w	$\Delta t/N$
0.001	3.690
.002	3.669
.005	3.635
.01	3.601
.02	3.568
.05	3.532
.10	3.523
.20	3.54
.50	3.68
1.0	3.94
2.0	4.43
4.0	5.65
7.0	8.45
8.83E*	9.74

* Ice + $HCl.3H_2O$. The value N_w = 9.04, given by Kremann (143) is not in agreement with the curve.

HClO (113)

0.2457	1.87
.4633	1.88

$HClO_4$ (291)

2.373	4.21
4.178	5.02
5.490	6.28
6.861	7.87
7.072E*	8.13

* Ice + Mix_{11}.

Br_2 (246)

0.006	2.02
.01	1.95
.02	1.90
.05	1.875
.10	1.870
.162	1.865
.139E*	1.868

* Ice + $Br_2.10H_2O$. N_w is taken from Roozeboom (9, 10, 11); his value for $\Delta t/N$ is 2.16, which does not agree with the accurate temperature measurements of Roth.

HBr (125, 214)

N_w	$\Delta t/N$
0.10	3.70
.20	3.55
.40	3.60
.70	3.78
1.0	4.0
2.0	4.8
4.0	6.5
6.88	9.4

I_2 (246)

0.00074	2.0

HI (140, 193, 216)

0.1	3.50
.2	3.56
.4	3.70
.7	3.88
1.0	4.09
2.0	4.75
4.0	6.55
5.0	7.70
7.63E*	10.5

* Ice + $HI.4H_2O$. Considerable uncertainty.

HIO_3 (84)

N_w	$\Delta t/N$
0.03	3.24
.05	3.12
.10	2.95
.20	2.71
.50	2.21
1.0	1.72
2.0	1.16
5.0	0.75
7.5	0.70
10.0	0.75
14.0	0.88
15.24E*	0.92

* Ice + HIO_3(extrap.).

HIO_4 (47)

N_v	$\Delta t/N$
0.20	2.18
.30	2.15
.50	2.12
.75	2.13
1.0	2.15

H_2SO_3 (7, 226)

N_w	$\Delta t/N$
0.1	2.8
.2	2.6
.4	2.45
.7	2.38
1.0	2.35

According to Roozeboom (11), the eutectic (ice + $H_2SO_3.6H_2O$) is located at N_w = 1.4, and $\Delta t/N$ = 1.86. Guthrie (92) gives Δt = 1.5. No agreement exists.

H_2SO_4 (13, 20, 100, 119, 159, 187, 206, 210, 211, 217, 244); *cf.* (298)

N_w	$\Delta t/N$
0.0025	5.052
.005	4.814
.01	4.584
.025	4.300
.05	4.112
.10	3.940
.20	3.790
.40	3.68
.70	3.77
1.0	4.04
2.0	5.07
4.0	7.05
6.25E*	12.0

* Ice + $H_2SO_4.4H_2O$.

$H_2S_2O_6$ (47)

N_v	$\Delta t/N$
0.04	5.12
.05	5.06
.075	5.00
.10	5.04
.20	5.14

H_2SeO_3 (47)

0.2	2.12
.3	2.08
.5	2.01
.75	1.96
1.0	1.93

H_2SeO_4 (148, 226)

N_w	$\Delta t/N$
0.2	3.88
.4	4.24
.7	4.70
1.0	5.06
2.0	6.00
4.0	7.96
6.36E*	13.05

* Ice + $H_2SeO_4.4H_2O$ (extrap.).

H_2TeO_4 (86, 183)

0.0725	2.1
.100	1.9
.189	2.0
.772E*	1.94

* $H_2TeO_4.6H_2O$.

N_2O* (78, 244)

0.0564	1.9

* This value (244) is based on 760 mm pressure. The other reference does not specify pressure, although it approximated barometric pressure.

NH_3* (252)
v. also NH_4OH

0.6	2.0
1.0	1.94
2.0	1.94
5.0	2.06
10.0	2.26
20.0	2.90

NH_3.—(*Continued*)

N_w	$\Delta t/N$
27.6	3.56

*E: Ice + $NH_3.H_2O$. According to Rupert (252), the eutectic lies below Δt = 120. According to Postma (219), it lies at N_w = 29.24 and Δt = 100.3°.

HNO_3 (119, 153, 161, 187, 245)

0.005	3.67
.01	3.64
.02	3.61
.05	3.55
.10	3.51
.20	3.47
.40	3.46
.70	3.51
1.0	3.58
2.0	3.79
4.0	4.16
7.67E*	5.64

* Ice + $HNO_3.3H_2O$.

NH_4OH (119)

0.006	2.11
.01	2.03
.02	1.97
.05	1.96

NH_4NO_2 (229)

NH_4NO_3 (160, 187, 235)

0.01	3.572
.02	3.535
.05	3.470
.10	3.396
.20	3.296
.50	3.11
1.0	2.92
2.0	2.65
5.0	2.17
9.344E*	1.784

* Ice + NH_4NO_3 (rhombic β).

NH_4Cl (23, 117, 160, 161, 187, 235)

0.005	3.617
.006	3.608
.01	3.582
.02	3.544
.05	3.489
.10	3.442
.20	3.392
.30	3.362
.50	3.34
1.0	3.33
2.0	3.34
3.0	3.345
4.0	3.35
4.58E*	3.354

* Ice + NH_4Cl.

NH_4I (88)

8.62E*	3.19

* Ice + NH_4I.

$NH_2SO_3H.NH_2OH$ (253)

$N_2H_6SO_4$ (266)
Hydrazine sulfate

$(NH_4)_2SO_4$ (235)

N_w	$\Delta t/N$
2.0	3.21
3.0	3.34
4.0	3.50
5.025E*	3.65

* Ice + $(NH_4)_2SO_4$.

$(NH_4)_2S_2O_8$ (182)

$(NH_2OH)_2.H_2S_2O_6$ (253)

$(N_2H_5)_2SO_4$ (266)
Hydrazine sulfate

HPO_3 (47, 107)

H_3PO_3 (7, 226)

H_3PO_2 (205)

0.1	2.94
.2	2.80
.5	2.59
1.0	2.46

H_3PO_4 (81, 119, 125, 160, 226; 240)

0.005	3.1
.01	2.95
.02	2.75
.04	2.57
.07	2.44
.10	2.36
.20	2.23
.40	2.13
.70	2.11
1.0	2.14
2.0	2.41
4.0	2.94
7.0	3.5
10.0	4.0
17.0E*	5.0

* Ice + $2H_3PO_4.H_2O$.

$H_4P_2O_6$ (45, 47)

N_v	$\Delta t/N$
0.05	3.94
.075	3.74
.10	3.63
.20	3.38
.50	3.19
.60	3.18

$H_4P_2O_7$ (47, 81)

0.10	3.80
.20	3.59
.30	3.46
N_w	$\Delta t/N$
8.08E*	9.28

* Ice+$H_4P_2O_7.1.5H_2O$.

$NH_2OH.H_3PO_2$ (253)

$NH_2PO(OH)_2$.-NH_2OH (253)

$(NH_4PO_3)_2$ (114, 253)

$(NH_2OH)_2.H_4P_2O_6$ (253)

H_3AsO_3 (92)
Eutectic: Δt = 0.5

H_3AsO_4 (173)

N_w	$\Delta t/N$
2.0	2.34
4.0	2.89
7.0	3.41
10.0	3.67

H_3AsO_4.—(*Cont'd*)

N_w	$\Delta t/N$
12.5	3.78
15.5E*	3.85

* Ice + $2H_3AsO_4.H_2O$ (extrap.).

CO*: Δt = 0.015° (68)

* Pressure = *ca.* 1 atm.

CO_2 (78)

0.05 to 0.08	2.1 to 2.2

$C_5H_{11}HSO_4$ (37)

$NH_4C_2H_3O_2$ (139)

N_v	$\Delta t/N$
0.01	3.6
.02	3.57
.05	3.55
.10	3.54
.20	3.54
.50	3.55

$(NH_4)_2C_2O_4$ (89)
E: N_w = 0.232
Δt = 0.2°

$N(CH_3)_4NO_2$ (229)

$(NH_4)_3C_6H_5O_7$ (232)
Citrate

$N(C_3H_7)_4NO_3$ (273)
Tetrapropylammonium nitrate

$(C_2H_5)_3NHCl$
$(C_2H_5)_3NHBr$
$(C_2H_5)_3NHI$
Triethylammonium halides (273).

NH_4CNS (251, 276)

N_w	$\Delta t/N$
0.7	3.24
1.0	3.23
2.0	3.17
4.0	3.06
7.0	2.86
9.38E*	2.69

* Ice + NH_4CNS.

$C_5H_{11}NH_4SO_4$ (37)

$AsO_4H_3.2C_6H_5NH_2$ (198)

H_2SiF_6 (226)

0.189	4.56

$Zr(SO_4)_2$ (39)

$SnCl_4$ (161)

0.01	12.6
.02	12.43
.04	12.18
.07	11.84
.10	11.42
.20	9.78

$PbCl_2$ (71)

$Pb(NO_3)_2$ (43, 100, 187, 217, 224)

0.001	5.368
.002	5.272
.005	5.090
.01	4.898

$Pb(NO_3)_2$.—(*Cont'd*)

N_w	$\Delta t/N$
0.02	4.657
.05	4.276
.10	3.955
.20	3.560
.50	2.940
1.00	2.435
1.061E*	2.4

* Ice + $Pb(NO_3)_2$.

$Pb(C_2H_3O_2)_2$ (92, 131)

0.03	4.3
.05	3.63
.10	2.85
.20	2.37
.40	2.15
.674E*	2.08

* Ice + $Pb(C_2H_3O_2)_2$.-3(?)H_2O.

TlCl (224)

0.0008	3.69
.001	3.685
.002	3.665
.004	3.641
.006	3.626

Tl_2SO_4 (61)

0.02	4.22
.03	4.00
.05	3.81

$TlHSO_4$ (61)

0.01	4.31
.02	4.20
.04	4.03
.07	3.82
.1015	3.71

$TlNO_3$ (62)

0.02	3.49
.04	3.36
.07	3.25
.10	3.18
.14	3.11

$TlHC_2O_4$ (61)

0.0154	3.57
.02	3.55
.04	3.42
.0619	3.31

$ZnCl_2$ (23, 118, 184, 187)

0.0025	5.41
.005	5.28
.01	5.15
.02	5.04
.04	4.96
.07	4.94
.10	4.94
.20	4.96
.40	5.03
.70	5.11
1.00	5.21
2.00	5.49
4.00	5.94
6.00	6.53
7.64E*	8.12

* Ice + $ZnCl_2.4H_2O$ (approx.).

$Zn(ClO_3)_2$ (174)

N_w	$\Delta t/N$
1.555	5.79
1.87	6.95

$ZnSO_4$ (42, 43, 44, 77, 100, 132, 187, 226)

0.0025	3.094
.004	2.993
.007	2.874
.01	2.80
.02	2.65
.04	2.49
.07	2.37
.10	2.29
.20	2.12
.40	1.95
.70	1.84
1.0	1.87
1.5	2.07
2.314E*	2.83

* Ice + $ZnSO_4.7H_2O$.

$Zn(NO_3)_2$ (77, 125, 251)

0.07	4.92
.10	4.89
.20	4.89
.40	5.03
.70	5.40
1.0	5.83
2.0	7.12
3.43E*	8.45

* Ice+$Zn(NO_3)_2.9H_2O$ (interp.).

$ZnC_2H_2O_4$ (35)
Formate

$ZnC_4H_2O_4$ (35)
Maleate

$Zn(C_2H_3O_2)_2$ (35, 83, 92)

0.06	4.9
.10	4.74
.20	4.37
.26	4.21
1.628E*	3.62

* Ice + $Zn(C_2H_3O_2)_2$.-3(?)H_2O.

$CdCl_2$ (118, 138, 187)

0.005	4.79
.01	4.71
.025	4.42
.05	4.12
.10	3.84
.20	3.57
.50	3.24

$Cd(ClO_3)_2$ (174)

1.27	5.1
3.935	3.3

$CdBr_2$ (118, 187)

0.005	4.76
.01	4.47
.025	4.03
.05	3.65
.10	3.22

CdI_2 (118, 125, 145, 187, 251)

N_w	$\Delta t/N$
0.005	4.06
.01	3.86
.025	3.34
.05	2.69
.10	2.27
.20	2.1
.50	2.1
1.0	2.25
1.5	2.60
2.1E*	3.57

* Ice + CdI_2 (extrap.).

$CdSO_4$ (100, 132, 187)

N_w	$\Delta t/N$
0.0025	3.080
.005	2.916
.01	2.744
.025	2.496
.05	2.3
.10	2.1
.20	1.93
.40	1.80
.70	1.76
1.0	1.79
1.25	1.86

$Cd(NO_3)_2$ (77, 118, 125, 187, 251)

N_w	$\Delta t/N$
0.0025	5.38
.003	5.35
.005	5.28
.01	5.20
.02	5.15
.04	5.12
.07	5.09
.10	5.08
.20	5.08
.40	5.13
.70	5.25
1.0	5.42
2.0	6.2
2.41E*	6.64

* Ice + $Cd(NO_3)_2.9H_2O$.

$Cd(C_2H_3O_2)_2$ (35)

N_w	$\Delta t/N$
0.03	5.08
.05	4.69
.10	4.15
.20	3.71
.30	3.54

$HgCl_2$ (23, 89)

N_w	$\Delta t/N$
0.019–0.092	1.8
.125E*	1.6

* Ice + $HgCl_2$.

$Hg(NO_2)_2$ (229)

$Hg(CN)_2$ (92, 222)

N_w	$\Delta t/N$
0.05–0.085	1.9–2.0
.319E*	1.41

* Ice + $Hg(CN)_2$.

$CuCl_2$ (23, 250)

N_w	$\Delta t/N$
0.035	4.89
.05	4.86
.10	4.81
.20	4.83
.40	4.96
.70	5.30

$CuCl_2$.—(*Cont'd*)

N_w	$\Delta t/N$
1.0	5.70
2.0	6.95
3.0	8.0
4.4E*	9.0

* Ice + $CuCl_2.2H_2O$. Value uncertain due to long extrap.

$Cu(ClO_3)_2$ (174)

N_w	$\Delta t/N$
1.907	6.29
2.790	8.96

$CuBr_2$ (23)

N_w	$\Delta t/N$
0.025	5.13
.05	5.10
.10	5.13
.20	5.23
.40	5.53
.60	5.89

$CuSO_4$ (20, 43, 44, 100, 187, 233)

N_w	$\Delta t/N$
0.0025	3.003
.003	2.972
.005	2.871
.01	2.703
.025	2.448
.05	2.266
.10	2.085
.20	1.912
.50	1.722
.70	1.690
.80	1.690
1.00	1.715
0.846E*	1.692

* Ice + $CuSO_4.5H_2O$.

$Cu(NO_3)_2$ (77, 125, 251)

N_w	$\Delta t/N$
0.07	5.3
.10	5.1
.20	5.0
.40	5.1
.70	5.4
1.0	5.7
2.0	6.7
3.0E*	8.0

* Ice + $Cu(NO_3)_2.9H_2O$ (extrap.).

$Cu(HCO_2)_2$ (35)

$Cu(C_2H_3O_2)_2$ (35)

N_w	$\Delta t/N$
0.06	3.50
.10	3.36
.20	3.13
.254	3.03

Cu, Propionate; *n*-Butyrate; Lactate; Malate (35)

$NH_4Cu(CN)_2$ (85)

$NH_4Cu(CN)_3$ (85)

Cu, Complexes of amino acids (142)

Pt, ammines (204)

$AgNO_3$ (179, 226, 242)

N_w	$\Delta t/N$
0.01	3.60
.02	3.54
.05	3.42

$AgNO_3$.—(*Cont'd*)

N_w	$\Delta t/N$
0.10	3.32
.20	3.20
.50	2.96
1.0	2.63
2.0	2.16
3.0	1.85
5.24E*	1.393

* Ice + $AgNO_3$ (rhombic).

$MnCl_2$ (23, 250)

N_w	$\Delta t/N$
0.04	4.9
.07	4.86
.10	4.86
.20	4.90
.40	5.10
.70	5.54
1.0	6.05
1.63	7.4

$MnSO_4$ (50, 132, 251)

N_w	$\Delta t/N$
0.126	2.28
0.2	2.14
0.4	1.99
0.7	1.95
1.0	2.02
2.0	2.5
3.15E*	3.34

* Ice + $MnSO_4.7H_2O$.

$Mn(NO_3)_2$ (77, 125, 251)

N_w	$\Delta t/N$
0.2	4.92
.4	5.34
.7	5.74
1.0	6.00
2.0	6.64
4.05E*	7.7

* Ice + $Mn(NO_3)_2.6H_2O$ (extrap.).

FeF_3 (203)

N_w	$\Delta t/N$
0.085	1.90
.171	1.88

$FeCl_2$ (23)

N_w	$\Delta t/N$
0.025	5.22
.04	5.15
.07	5.13
.10	5.12
.20	5.16
.40	5.43

$FeCl_3$ (12, 203)

N_w	$\Delta t/N$
0.02	6.93
.05	6.28
.10	6.01
.20	6.02
.50	6.55
1.0	8.18
1.5	10.30
2.0	12.45
2.63	15.2
3.05E*	18

* Ice + $FeCl_3.6H_2O$.

$FeSO_4$ (75)

N_w	$\Delta t/N$
0.07	2.555
.10	2.39
.20	2.10
.40	1.87

$FeSO_4$.—(*Cont'd*)

N_w	$\Delta t/N$
0.70	1.80
.80	1.81
.983E*	1.856

* Ice + $FeSO_4.7H_2O$.

$Fe(NO_3)_2$ (77)

N_w	$\Delta t/N$
2.35	6.16
2.66	7.14
2.78	7.56
3.06E*	9.15

* Ice + $Fe(NO_3)_2.9H_2O$.

$Fe(NO_3)_3$ (125)

N_w	$\Delta t/N$
0.07	6.37
.10	6.30
.20	6.48
.40	7.08
.70	8.10
1.0	9.4
1.65	13.0

$Fe(NH_4)_2(SO_4)_2$ (138)

$Fe_2(NH_4)_2(SO_4)_4$ (127)

$Fe_2(C_2O_4)_3$ (256)

$Fe_2(C_2H_3O_2)_5OH$ (239)

$Fe(C_2H_3O_2)_2Cl$ (239)

$Fe(C_2H_3O_2)_2Br$ (239)

$(NH_4)_3Fe(C_2O_4)_3$ (138)

$(NH_4)_2[Fe(CN)_5NO]$ (33)

$CoCl_2$ (93, 145, 251)

N_w	$\Delta t/N$
0.002	5.35
.005	5.208
.010	5.107
.025	4.989
.05	4.918
.10	4.882
.15	4.900
.20	4.946
.25	4.997
.40	5.170
.70	5.67
1.0	6.31
1.5	7.48
2.0	8.51
2.43E*	9.26

* Ice + $CoCl_2.6H_2O$ (extrap.).

$Co(ClO_3)_2$ (174)

N_w	$\Delta t/N$
1.894	6.34
2.645	8.32

$Co(ClO_4)_2$ (82)

N_w	$\Delta t/N$
1.265	8.6
1.625	13.1
2.248	13.7

E*: Δt = 62.2°

* Ice + $Co(ClO_4)_2.9H_2O$.

$CoBr_2$ (109)

N_w	$\Delta t/N$
0.12	5.05
.20	5.07
.34	5.37

$CoSO_4$ (132)

N_w	$\Delta t/N$
0.094	2.22
.20	2.02
.50	1.75
.70	1.70
.91	1.74

$Co(NO_3)_2$ (125)

N_w	$\Delta t/N$
0.1	4.6
.2	4.5
.4	4.7
.7	5.1
1.0	5.5
(77, 145)	
2.29	6.13
2.67	6.73
3.12	7.05
3.57E*	7.29

* Ice + $Co(NO_3)_2.9H_2O$.

$Co(NH_3)_3.(NO_2)_3$ (97)

N_w	$\Delta t/N$
0.002	1.87

$Co(NH_3)_2.(NO_2)_4.NH_4$ (97)

$Co(NH_3)_4.(NO_2)_2.NO_2$ (97)

$Co(NH_3)_5.Cl.Cl_2$ (97)

$Co(NH_3)_6Cl_3$ (97)

N_w	$\Delta t/N$
0.002	6.495
.005	6.180
.010	6.435
.016	5.765

$Co(NH_3)_4.(NO_2)_2.Cl$ (97)

N_w	$\Delta t/N$
0.002	3.66
.005	3.622
.01	3.590
.02	3.556

$Co(NH_3)_5.NO_2.Cl_2$ (97)

N_w	$\Delta t/N$
0.002	5.26
.005	5.123
.010	4.989

Co, Ammines of other types (204, 285, 286)

$Co(C_2H_3O_2)_2$ (35)

N_w	$\Delta t/N$
0.06	5.00
.10	4.58
.20	4.37
.25	4.36

$Co(CNS)_2$ (96)

N_w	$\Delta t/N$
0.046	4.74
.07	4.19
.10	3.73
.15	3.46
.229	3.35

$NiCl_2$ (23, 92, 251)

N_w	$\Delta t/N$
0.02	5.58
.05	5.41
.10	5.38
.20	5.43

$NiCl_2$.—(*Continued*)

N_w	$\Delta t/N$
0.50	5.69
1.0	6.22
1.5	7.34
2.0	8.67

E*: Δt = 10.35°

* Ice + $NiCl_2$.(?)H_2O.

$Ni(ClO_3)_2$ (174)

N_w	$\Delta t/N$
1.606	5.60
2.067	6.53

$Ni(ClO_4)_2$ (82)

N_w	$\Delta t/N$
1.283	8.5
1.809	11.8
2.710	11.3

E*: Δt = 49.0°

* Ice + $Ni(ClO_4)_2.9H_2O$.

$NiSO_4$ (100, 132, 187, 268)

N_w	$\Delta t/N$
0.0025	3.220
.003	3.192
.005	3.036
.01	2.832
.02	2.63
.05	2.37
.10	2.20
.20	2.05
.40	1.95
.70	1.92
1.0	1.94
1.676E*	2.48

* Ice + $NiSO_4.7H_2O$ (extrap.).

$Ni(NO_3)_2$ (125, 251)

N_w	$\Delta t/N$
0.08	4.92
.10	4.91
.20	4.91
.40	5.04
.70	5.38
1.0	5.86
1.3	6.34
(77, 145)	
2.42	6.2
2.77	6.68
3.26	7.06
3.46E*	7.8

* Ice + $Ni(NO_3)_2.9H_2O$ (extrap.). These sets of data are not in agreement.

$Ni(N_2H_4)(H_2O)_3SO_4$ (266)

Hydrazineato-triaquo nickel sulfate

$Ni(C_2H_3O_2)_2$ (35)

N_w	$\Delta t/N$
0.04	5.1
.05	4.92
.10	4.62
.20	4.48

$(NH_4)_2(COS)_4Ni$ (234)

CrO_3 (32, 146)

N_w	$\Delta t/N$
0.2	2.3
.4	2.2
.7	2.34
1.0	2.50
2.0	2.94
4.0	3.52
7.0	4.06
10.0	4.56
13.36E*	7.8
15.32E†	10.11

* Ice + CrO_3 (extrap.) (146).
† (32).

$CrCl_2$ (141)

$Cr_2(SO_4)_3$ (127)

N_v	$\Delta t/N$
0.025	4.8
.05	4.6
.10	4.2
.25	4.1

$Cr(NH_3)_6Br_3$ (204)

N_w	$\Delta t/N$
0.015	6.34
.02	6.16
.03	5.88
.05	5.52
.10	5.03

$CrNH_4(SO_4)_2$ (127)

$(N_2H_5)_2Cr(SO_4)_2.12H_2O$ (266)
Hydrazine chromium sulfate

Cr, Acetates, complex (283)

Cr, Ammines (204, 207, 284)

$Cr(C_2H_4N_2H_4)_3Cl_3$ (207)

N_w	$\Delta t/N$
0.03	5.27
.05	5.01
.10	4.49

MoO_3 (238)

Mo_3O_8 (168)

$Mo(OH)_2Cl_2$ (274)

$(NH_4)_2Mo_2O_8$ (182)

$MoO_2.(OCH_3)_2$ (238)

$(WO_3)_4.H_2O$ (257)

$H_3PO_4.12WO_3$ (257)

UO_2Cl_2 (56)

N_w	$\Delta t/N$
0.03	5.37
.05	5.23
.10	5.03
.30	4.87
.60	4.84

UO_2SO_4 (56)

0.03	2.35
.05	2.20
.10	2.00
.30	1.72
.60	1.58

$UO_2(NO_3)_2$ (56, 277)

N_w	$\Delta t/N$
0.03	5.32
.05	5.16
.10	5.00
.20	4.92
.40	5.08
.70	5.58
1.00	6.15
1.50	7.40
1.923E*	9.41

* Ice + $UO_2(NO_3)_2.6H_2O$.

$UO_2C_4H_4O_6$ (56)

0.0643	1.9

$UO_2(C_2H_3O_2)_2$ (56)

0.015	3.73
.03	3.23
.07	2.69
.13	2.32

$UO_2(CNS)_2$ (197)

N_v	$\Delta t/N$
0.122	4.62

VCl_3 (209)

N_w	$\Delta t/N$
0.02	9.35
.04	8.77
.07	8.68
.10	8.68
.20	8.88
.26	9.31

HBO_2 (134)

H_3BO_3 (47, 134, 186)

0.10	2.0
.20	1.92
.30	1.94
.376E*	2.02

* Ice + H_3BO_3.

$H_2B_4O_7$ (134)

$AlCl_3$ (125)

N_v	$\Delta t/N$
0.01	7.10
.02	6.62
.05	6.02
.10	5.68
.20	5.76
.30	6.14
.50	7.06
1.00	9.45
2.12	21.2

$Al(ClO_3)_3$ (243)

N_w	$\Delta t/N$
0.013	5.970
.02	5.785
.05	5.620
.10	5.687
.20	5.940
.50	6.71
.70	7.62

$AlBr_3$ (130)

N_v	$\Delta t/N$
0.0133	6.77
.05	6.40
.10	6.40

$Al_2(SO_4)_3$ (149)

N_w	$\Delta t/N$
0.20	3.92
.50	4.19
.878E*	4.56

* Ice + $Al_2(SO_4)_3.18H_2O$.

$Al(NO_3)_3$ (125)

N_v	$\Delta t/N$
0.05	6.3
.10	6.1
.20	6.5
.50	7.9
.75	9.0
1.00	10.6

$AlNH_4(SO_4)_2$ (89)
E: Δt = 0.20°, ice + $AlNH_4(SO_4)_2.12H_2O$

$(N_2H_5)_2Al(SO_4)_2.12H_2O$ (266)
Hydrazine aluminium sulfate

$Al(OH)(C_2H_3O_2)_2$ (243)

N_w	$\Delta t/N$
0.02	2.31
.05	2.22
.10	2.09
.20	1.85
.30	1.66

$LaCl_3$ (26)

0.03	7.4
.05	6.9
.10	6.5
.20	6.4
.322	6.3

$La_2(SO_4)_3$ (108)

0.001	7.14
.002	6.36
.004	5.55
.007	4.87
.01	4.41

$La(NO_3)_3$ (93)

0.001	7.00
.002	6.314
.005	6.483
.01	6.233
.02	6.007
.05	5.743
.10	5.607
.18	5.042

$CeCl_3$ (40)

0.0204	4.66
.031	4.40
.041	4.39
.083	4.34
.104	4.52
.125	4.48
.147	4.49
.169	4.56

$Pr(NO_3)_3$ (122)

N_v	$\Delta t/N$
0.0475	5.97
.0950	5.71
.190	5.53
.380	5.74

$NdCl_3$ (26, 169)

N_w	$\Delta t/N$
0.03	6.6
.05	6.3
.10	5.9
.15	5.8

$Nd_2(SO_4)_3$ (26)

0.0067	8.5
.01	6.4
.02	4.6
.05	3.8
.08	3.6

$BeCl_2$ (76)

0.025	5.55
.05	5.28
.10	5.15
.15	5.22
.25	5.44

$BeSO_4$ (58)

0.03	2.50
.05	2.33
.10	2.21
.20	2.12
.30	2.06

$Be(NO_3)_2$ (58)

0.05	4.71
.10	4.65
.20	4.60
.30	4.57

$MgCl_2$ (106, 160, 187, 233, 235)

0.01	5.144
.025	5.032
.05	4.974
.10	4.938
.20	4.977
.50	5.38
1.0	6.35
2.0	8.8
2.94E*	11.4

* Ice + $MgCl_2.12H_2O$.

$Mg(ClO_3)_2$ (174)

1.496	5.35
1.871	6.41

$MgBr_2$ (125)

0.05	5.34
.10	5.11
.20	5.19
.40	5.54
.70	6.14
1.0	6.87

$MgSO_4$ (20, 42, 44, 51, 90, 93, 100, 108, 132, 226, 251)

0.0005	3.5
.001	3.38
.002	3.24
.0025	3.18
.004	3.08
.005	3.02
.007	2.94
.01	2.85
.025	2.589
.05	2.420
.10	2.252
.20	2.090

$MgSO_4$.—(*Cont'd*)

N_w	$\Delta t/N$
0.25	2.036
.40	1.99
.70	1.98
1.0	2.02
1.4	2.15
1.636E*	2.38

* Ice + $MgSO_4.12H_2O$.

$Mg(NO_3)_2$ (77, 233)

0.08	4.73
.10	4.74
.20	4.78
.30	4.85
.50	5.08
.70	5.35
1.0	5.78
1.5	6.43
2.0	7.0
3.0	7.85
3.57E*	8.1

* Ice + $Mg(NO_3)_2.9H_2O$ (extrap.).

$(N_2H_5)_2Mg(SO_4)_2.4H_2O$ (266)
Hydrazine magnesium sulfate

Mg, Formate; Fumarate; Maleate; Malate (35)

$MgCu_2(CN)_4$ (85)

$MgPt(CN)_4$ (34, 138)

MgB_4O_6 (228)

CaO (92)

N_w	$\Delta t/N$
0.049E*	3.05

* Ice + $CaO.H_2O$?

$CaCl_2$ (161, 187, 217, 235, 263)

0.01	5.112
.025	4.966
.05	4.886
.10	4.832
.15	4.810
.20	4.78
.30	4.78
.50	4.98
1.0	5.85
2.0	7.68
3.0	9.33
4.325E*	11.79

* Ice + $CaCl_2.6H_2O$.

$CaBr_2$ (175)

0.05	5.07
.10	5.12
.20	5.22
.30	5.31

CaI_2 (175)

0.03	4.95
.05	4.91
.10	4.88
.20	4.93

CaS_2O_3 (151)

N_v	$\Delta t/N$
0.5	2.14
0.8	2.14
1.3	2.41

CaS_2O_6 (110)

N_w	$\Delta t/N$
0.104	3.08
.310	2.74
.494	2.79
.508	2.78
.773E*	2.70

* Ice + $CaS_2O_6.4H_2O$.

$Ca(NO_2)_2$ (195)

1.5	2.62
2.0	3.14
3.0	3.83
4.076E*	4.3

* Ice + $Ca(NO_2)_2.4H_2O$.

$Ca(NO_3)_2$ (15, 125, 188)

0.05	4.7
.10	4.58
.20	4.50
.40	4.47
.70	4.51
1.0	4.59
2.0	4.86
3.0	5.18
4.0	5.78
4.578E*	6.27

* Ice+$Ca(NO_3)_2.4H_2O$.

$Ca(CHO_2)_2$ (35)

$Ca(C_2H_3O_2)_2$ (35)

0.06	5.02
.10	4.76
.20	4.59
.30	4.58
.50	4.61

Ca, Salicylate; Lactate (35)

$Ca(C_6H_5CO_2)_2$ (267)
E: Δt = 0.37°

$CaCu(CN)_3$ (85)

$CaCu_3(CN)_5$ (85)

$Ca_2Fe(CN)_6$ (188)

N_w	$\Delta t/N$
0.02	2.67
.05	2.40
.10	2.15

$Sr(OH)_2$ (92)

0.0371E*	2.7

* $Sr(OH)_2.8H_2O$.

$SrCl_2$ (42, 43, 161, 251)

0.01	5.3
.02	5.10
.04	4.94
.07	4.85
.10	4.82
.20	4.80
.40	4.91
.70	5.33
1.00	5.83
2.00	7.54
2.24E*	8.35

* Ice + $SrCl_2.6H_2O$ (extrap.).

$SrBr_2$ (175, 180)

N_w	$\Delta t/N$
0.10	5.6
.20	5.4
.40	5.7
.70	6.20
1.0	6.65
2.0	8.35
2.89E*	9.69

* Ice + $SrBr_2.6H_2O$.

SrI_2 (125, 175)

0.03	5.4
.07	5.23
.10	5.2
.20	5.3
.40	5.8
.70	6.58
1.0	7.17

$Sr(NO_2)_2$ (195)

0.70	1.81
1.0	2.10
2.0	2.43
2.72E*	2.50

* Ice + $Sr(NO_2)_2.H_2O$.

$Sr(NO_3)_2$ (42, 43, 44, 125, 129, 251)

0.01	5.7
.02	5.35
.04	5.00
.07	4.76
.10	4.63
.20	4.40
.40	4.17
.70	4.00
1.0	3.90
1.533E*	3.78

* Ice+$Sr(NO_3)_2.4H_2O$.

$Sr(CHO_2)_2$ (35)

$Sr(C_2H_3O_2)_2$ (35)

0.06	5.57
.10	5.16
.20	4.90
.30	4.89
.50	4.96

$SrCu_2(CN)_4$ (85)

BaO (92)

0.098E*	5.10

* Ice+$Ba(OH)_2.8H_2O$.

$Ba(OH)_2$ (104)

$BaCl_2$ (20, 91, 93, 118, 138, 160, 161, 187, 217, 251)

0.001	5.30
.002	5.225
.005	5.120
.01	5.034
.02	4.938
.05	4.796
.10	4.698
.20	4.64
.40	4.74
.70	4.95
1.00	5.20
1.346E*	5.57

* Ice + $BaCl_2.2H_2O$.

$Ba(ClO_3)_2$ (271)

N_w	$\Delta t/N$
0.5927E*	4.638 ± 0.007

* Ice+$Ba(ClO_3)_2.H_2O$.

$BaBr_2$ (175, 180, 233)

0.08	4.86
.10	4.85
.20	4.85
.30	4.90
.50	5.06
1.0	5.58
2.0	6.72
2.936E*	7.7

* Ice + $BaBr_2.2H_2O$.

$Ba(BrO_3)_2$ (271)

0.00714E	4.76* ± 0.28

* Ice + $Ba(BrO_3)_2.H_2O$.

BaI_2 (175)

0.03	5.12
.05	5.07
.10	5.00
.15	4.99
.20	5.02

$Ba(IO_3)_2$ (271)

Conc. %*	Δt
0.008E†	0.046 ± 0.002°

* Either temperature or concentration must be in error.

† Ice + $Ba(IO_3)_2.H_2O$.

BaS_2O_6 (110)

N_w	$\Delta t/N$
0.077	3.12
.139	2.44
.203	2.36
.275E*	2.33

* Ice + $BaS_2O_6.2H_2O$.

$Ba(NO_2)_2$ (195)

0.5	3.39
1.0	3.18
2.0	2.90
2.296E*	2.83

* Ice + $Ba(NO_2)_2.H_2O$.

$Ba(NO_3)_2$ (89, 100, 108, 187, 233); *cf.* (298)

0.001	5.39
.002	5.29
.004	5.18
.007	5.08
.01	5.01
.02	4.87
.04	4.68
.07	4.45
.10	4.25
.20	3.79
.214E*	3.74

* Ice + $Ba(NO_3)_2$.

$Ba(CHO_2)_2$ (35)

$Ba(C_2H_3O_2)_2$ (35)

0.03	5.19
.05	5.06
.10	4.82
.20	4.81

$Ba(C_2H_3O_2)_2$.—(*Continued*)

N_w	$\Delta t/N$
0.30	4.79
.50	4.87

Ba, Propionate; Salicylate (35)

$BaCu(CN)_3$ (85)

$BaCu_2(CN)_4$ (85)

$Ba[NO.(CN)_5.Fe]$ (33)

N_v	$\Delta t/N$
0.025	3.56
.04	3.18
.07	2.92
.10	2.82
.20	2.73

LiOH (212, 226)

N_w	$\Delta t/N$
0.34	3.72
.70	3.4
1.0	3.3
2.0	3.23
4.0	3.29
5.28E*	3.4

* Ice + $LiOH.H_2O$.

LiCl (58, 111, 112, 161, 187, 235, 282)

0.005	3.612
.006	3.609
.01	3.598
.02	3.582
.05	3.553
.10	3.52
.20	3.50
.30	3.51
.50	3.58
1.0	3.80
2.0	4.41
3.0	5.04
4.0	5.56
4.4	4.75

$LiClO_3$ (144.5)

2	4.42
2.5	4.493
3	4.612
3.5	4.80
4	5.30
4.5	5.265
5	5.507
5.5	5.724
6.0	5.94
6.50E*	6.16

* Ice + $LiClO_3.3H_2O$.

LiBr (23)

0.075	3.72
.10	3.71
.20	3.70
.50	3.80
1.00	4.0

LiI (23)

0.075	3.63
.10	3.64
.20	3.67
.50	3.78
.75	4.1

Li_2SO_4 (58)

N_w	$\Delta t/N$
0.0536	4.6
.106	4.62
.272	4.35
.866	4.33

$LiNO_2$ (195)

2.0	3.66
4.0	3.81
6.0	3.93
7.864E*	3.98

* Ice + $LiNO_2.H_2O$.

$LiNO_3$ (23, 57)

0.04	3.38
.10	3.35
.20	3.33
.50	3.35
1.00	3.48

E*: Δt = 17.8°.

* Ice + $LiNO_3.3H_2O$.

$(N_2H_5)_2Li_2(SO_4)_2$ Hydrazine lithium sulfate (266)

Li_2SiO_3 (133)

0.008	9.0
.01	8.6
.02	7.7
.0312	7.3

$Li_2Si_2O_{11}$ (133)

$LiCu(CN)_3$ (85)

$Li_2O.B_2O_3$ (156)

0.0607E*	9.88

* Ice + $Li_2O.B_2O_3.16H_2O$.

NaOH (119, 140, 161, 212)

0.01	3.55
.02	3.51
.05	3.46
.10	3.42
.20	3.41
.50	3.40
1.0	3.44
2.0	3.58
4.0	4.10
6.11E*	4.58

* Ice + $NaOH.7H_2O$ (extrap.).

NaF (92, 203)

0.04	3.73
.07	3.65
.10	3.60
.20	3.50
.50	3.35

E*: Δt = 5.6°

* Ice + NaF.

NaCl (13, 72, 98, 100, 111, 112, 118, 161, 187, 194, 217, 233, 235)

0.001	3.66
.002	3.655
.004	3.642

NaCl.—(*Continued*)

N_w	$\Delta t/N$
0.007	3.620
.01	3.604
.02	3.570
.04	3.530
.07	3.498
.10	3.478
.20	3.424
.40	3.38
.70	3.36
1.0	3.37
2.0	3.45
3.0	3.605
4.0	3.785
5.20E*	4.061

* Ice + $NaCl.2H_2O$.

$NaClO_3$ (72)

0.001	3.682
.002	3.663
.004	3.635
.007	3.606
.01	3.588
.02	3.547
.04	3.498
.07	3.459
.10	3.433

NaBr (88, 111, 187, 233)

0.02	3.611
.05	3.551
.10	3.507
.20	3.468
.50	3.456
1.0	3.51
2.0	3.68
6.56E*	4.27

* Ice + $NaBr.5H_2O$.

$NaBrO_3$ (72, 112, 187)

0.001	3.69
.002	3.678
.004	3.658
.007	3.632
.01	3.609
.02	3.568
.05	3.492
.10	3.418

NaI (125, 178, 250)

0.08	3.74
.10	3.68
.20	3.52
.40	3.48
.70	3.55
1.0	3.66
2.0	3.97
ca. 4.27E*	7.4

* Ice + $NaI.5H_2O$.

$NaIO_3$ (93, 112, 187)

0.002	3.617
.005	3.594
.01	3.560
.02	3.511
.05	3.412
.10	3.288

Na_2S (116)

N_v	$\Delta t/N$
0.10	7.12
.20	7.06
.40	6.97
.70	6.90
1.0	6.87
1.43	6.86
N_w (254)	$\Delta t/N$
1.039E*	9.15

* Ice + $Na_2S.9H_2O$

The results of (116) and (254) are not in agreement.

Na, Polysulfides (152)

Na_2SO_3 (73, 99)

N_w	$\Delta t/N$
0.15	4.48
.20	4.36
.40	4.03
.70	3.74
.992E*	3.54

* Ice + $Na_2SO_3.7H_2O$.

Na_2SO_4 (6, 98, 160, 187); *cf.* (298)

0.005	5.2
.01	5.04
.02	4.874
.04	4.670
.07	4.477
.10	4.344
.20	4.057
.25	3.944
.282E*	3.89

* Ice + $Na_2SO_4.10H_2O$.

$Na_2S_2O_3$ (92, 231)

N_v	$\Delta t/N$
0.2	4.24
.4	3.94
.54	3.70
N_w	$\Delta t/N$
ca. 2.71E*	4.05

* Ice + $Na_2S_2O_3.5H_2O$.

$Na_2S_2O_4$ (115, 157)

N_w	$\Delta t/N$
0.04	4.8
.07	4.7
.10	4.6
.20	4.47
.40	4.29
.70	4.2
1.09E*	4.2

* Ice + $Na_2S_2O_4.2H_2O$.

$Na_2S_2O_5$ (73)

0.08	7.26
.10	7.05
.20	6.60
.40	6.24
.70	5.96
1.0	5.78
1.616E*	5.60

* Ice + $Na_2S_2O_5.7H_2O$.

$NaHSO_4$ (60)

0.1004	4.05

Na_2SeO_3 (47)

N_v	$\Delta t/N$
0.05	4.95
.10	4.74
.20	4.51
.34	4.32

$NaHSeO_3$ (47)

0.07	3.62
.10	3.59
.20	3.49
.50	3.30

$NaNO_2$ (195)

N_w	$\Delta t/N$
1.6	2.76
2.0	2.65
4.0	2.24
7.0	1.85
9.54E*	1.62

* Ice + $NaNO_2$.

$NaNO_3$ (160, 187, 233, 235, 242)

0.01	3.55
.02	3.53
.04	3.484
.07	3.438
.10	3.406
.20	3.327
.40	3.22
.70	3.11
1.0	3.02
2.0	2.79
4.0	2.53
7.35E*	2.375

* Ice + $NaNO_3$.

$NaPO_3$ (114, 269)

Na_3PO_4 (161)

0.01	7.15
.02	6.85
.05	6.11
.10	5.69

NaH_2PO_2 (205)

NaH_2PO_4 (205)

Na_2HPO_4 (94, 161)

0.01	4.99
.02	4.85
.05	4.61
.10	4.34
.104E*	4.53

* Ice + $Na_2HPO_4.12H_2O$. $\Delta t/N = 4.32$ would agree with the curve.

$NaNH_4.HPO_4$ (161)

0.01	4.95
.02	4.78
.05	4.51
.10	4.23
.20	3.87

Na_2CO_3 (89, 119, 160)

0.01	5.12
.02	4.93
.04	4.73
.07	4.55
.10	4.44
.20	4.17
.40	3.88
.595E*	3.53

* Ice + $Na_2CO_3.10H_2O$.

$Na_2C_2O_4$ (92)

E: $\Delta t = 1.7°$

$Na_6C_{12}O_{12}$ (270)
Mellitate

$NaCHO_2$ (259)

$NaHCO_3$ (83)

N_w	$\Delta t/N$
0.1	3.65
.2	3.51
.4	3.26
.7	3.02

$NaC_2H_3O_2$ (91, 125, 140, 251)

0.06	3.63
.10	3.59
.20	3.58
.40	3.62
.70	3.70
1.0	3.78
2.0	4.14
3.7E*	4.86

* Ice + $NaC_2H_3O_2.?H_2O$.

$NaC_3H_5O_3$ (259)
Lactate

$NaC_4H_7O_2$ (205)
Butyrate

$NaC_7H_5O_3$ (259)
Salicylate

$NaC_7H_5O_2$ (259)
Benzoate

$NaC_{18}H_{33}O_2$ (135)
Oleate

$Na_2C_4H_4O_4$ (205)
Succinate

$Na_2C_6H_6O_7$ (105)
Citrate

$NaC_2H_2ClO_2$ (259)
Chloroacetate

$NaC_2HCl_2O_2$ (205, 259)
Dichloroacetate

$NaC_2Cl_3O_2$ (259)
Trichloroacetate

$C_5H_{11}NaSO_4$ (37)

Na, Cyanoacetates (295)

***d*-$NaNH_4C_4H_4O_6$ (225)**

***dl*-$NaNH_4C_4H_4O_6$ (225)**

$Na_2Si_5O_{11}$ (133)

Na_2SiO_3 (161)

N_w	$\Delta t/N$
0.01	6.6
.02	6.42
.04	6.06
.07	5.64
.10	5.32
.20	4.71
.50	4.02

$NaHSiO_3$ (133)

$Na_2Hg(SO_3)_2$ (14)

$NaSO_3.HgOH$ (14)

$NaCu(CN)_2$ (85)

$NaCu_2(CN)_3$ (85)

$Na_2Cu(CN)_3$ (85)

$Na_3Cu(CN)_4$ (85)

$Na_2[Fe(CN)_5NO]$ (33)

$Co(NO_2)_6Na_3$ (97)

N_w	$\Delta t/N$
0.0163	6.74
.0312	6.89

Na_2CrO_4 (125, 293)

0.1	4.49
.2	4.23
.4	3.97
.7	3.80
1.0	3.71

E:* $\Delta t = 4.9°$

* Ice + $Na_2CrO_4.10H_2O$.

$Na_2Cr_2O_7$ (125)

0.1	4.82
.2	4.62
.4	4.50

$Cr(CNS)_6Na_3$ (41)

$NaVO_3$ (63)

$NaBO_2$ (172)

N_v	$\Delta t/N$
0.04	3.56
.07	3.38
.10	3.26

$Na_2B_4O_7$ (134)

0.015	10.4
.02	10.0
.04	8.96
.07	8.0
.10	7.2

Na, Salts of the acids of boron (134)

KOH (100, 119, 140, 161, 187, 190, 212)

N_w	$\Delta t/N$
0.005	3.66
.01	3.65
.02	3.62
.05	3.50
.10	3.42
.20	3.39
.50	3.44
1.0	3.60
2.0	3.96
3.0	4.41
5.0	5.77
7.95	8.2

KF (23)

0.06	3.47
.10	3.39
.20	3.35
.50	3.36
1.00	3.39

KCl (4, 13, 20, 72, 101, 108, 111, 112, 117, 160, 161, 187, 217, 233, 235)

0.001	3.66
.002	3.658

KCl.—(*Continued*)

N_w	$\Delta t/N$
0.005	3.648
.01	3.610
.02	3.566
.05	3.503
.10	3.451
.20	3.394
.50	3.314
1.0	3.250
1.5	3.223
2.0	3.220
3.0	3.231
3.30E*	3.24

* Ice + KCl.

$KClO_3$ (87, 112, 187)

0.01	3.556
.02	3.513
.05	3.435
.10	3.334

E: $\Delta t = 0.5°$

KBr (111, 187, 217, 233, 235)

0.025	3.550
.05	3.500
.10	3.452
.20	3.400
.30	3.368
.50	3.330
1.0	3.290
2.0	3.275
3.0	3.279
3.836E*	3.285

* Ice + KBr.

$KBrO_3$ (112, 187)

0.01	3.573
.02	3.524
.05	3.445
.10	3.348

KI (19, 23, 150, 233)

0.08	3.58
.10	3.54
.20	3.44
.50	3.38
1.0	3.37
2.0	3.40
3.0	3.45
5.0	3.50
6.58E*	3.50

* Ice + KI.

KIO_3 (93, 112, 187)

0.002	3.61
.005	3.595
.01	3.558
.02	3.505
.05	3.402
.10	3.273

KIO_4 (47)

$K_4I_2O_9.9H_2O$ (47)

$K_3IO_5.4H_2O$ (47)

K_2SO_3 (73)

N_w	$\Delta t/N$
0.30	4.49
.50	4.29
.70	4.21
1.0	4.19

K_2SO_3.—(*Cont'd*)

N_w	$\Delta t/N$
2.0	4.53
3.0	5.13
5.0	6.13
6.577E*	6.92

* Ice + K_2SO_3.

K_2SO_4 (6, 30, 93, 108, 118, 145, 160, 187, 194, 217, 233)

0.001	5.280
.0025	5.258
.005	5.150
.01	5.010
.025	4.772
.05	4.559
.10	4.319
.20	4.044
.30	3.882
.402E*	3.79

* Ice + K_2SO_4.

$K_2S_2O_5$ (73)

0.16	6.25
.20	6.13
.50	5.64
1.0	5.20
1.07E*	5.14

* Ice + $K_2S_2O_5.\frac{2}{3}H_2O$.

$K_2S_2O_6$ (47)

N_v	$\Delta t/N$
0.06	4.5
.10	4.1
.12	4.0

$K_2S_2O_8$ (182, 221)

KNO_2 (195)

N_w	$\Delta t/N$
2.0	1.98
4.0	1.93
7.0	1.82
10.0	1.68
15.0	1.45
20.0	1.26
29.92E*	1.056

* Ice + KNO_2.

KNO_3 (4, 87, 155, 187, 233, 242)

0.002	3.655
.005	3.638
.01	3.590
.02	3.537
.05	3.431
.10	3.314
.20	3.154
.30	3.048
.50	2.882
1.0	2.56
1.247E*	2.41

* Ice + KNO_3 (rhombic).

KPO_3 (269)

$K_4P_2O_6$ (47)

$K_4P_2O_7$ (47)

KH_2PO_4 (161)

N_w	$\Delta t/N$
0.02	3.59
.05	3.47
.10	3.34
.20	3.19

$K_aH_bP_2O_c$ (47)
Various salts

K_2CO_3 (42, 44, 119, 160, 177)

N_w	$\Delta t/N$
0.01	5.20
.02	5.00
.05	4.74
.10	4.56
.20	4.42
.50	4.39
1.0	4.51
2.0	5.01
3.0	5.87
4.0	6.95
4.74E*	7.7

* Ice + $K_2CO_3.xH_2O$.

$K_2C_2O_4$ (140)

N_v	$\Delta t/N$
0.1	4.46
.25	4.26
.5	4.18
N_w (92)	$\Delta t/N$
1.62E	3.9

$KHCO_3$ (73)

N_w	$\Delta t/N$
0.25	3.21
.50	3.09
1.0	2.91
2.0	2.68

KHC_2O_4 (61)

0.025	3.63
.05	3.49
.10	3.34
.15	3.24

$KC_2H_3O_2$ (91)

0.50	3.78
1.0	3.92
2.0	4.22
3.0	4.55
4.37	5.15

$K_2C_4H_4O_6$ (131)

0.05–0.9	3.8 ± 0.1

$C_5H_{11}KSO_4$ (37)

KCN (23, 158)

0.03	3.55
.05	3.49
.10	3.41
.20	3.34
.50	3.27
1.0	3.25
2.0	3.27
5.0	3.44
7.0	3.51

E: $\Delta t = 29.61°$

KCNO (158)

1.2	3.44
2.0	3.65
3.0	3.91
4.0	4.45

E: $\Delta t = 18.14°$

KCNS (23)

N_w	$\Delta t/N$
0.06	3.49
.10	3.44
.20	3.37
.50	3.25
.85	3.16
(251)	
1.029	3.16
2.058	3.16
3.086	3.17
(276)	
10.4E*	3.0

* Ice + KCNS.

$KAsOC_4H_4O_6$ (131)

$KSbOC_4H_4O_6$ (16, 131)

N_w	$\Delta t/N$
0.03– 0.125	2.1 ± 0.2

K_2SiO_3 (133)

N_v	$\Delta t/N$
0.015	7.07
.02	7.02
.05	6.55
.10	5.87
.125	5.68

$KHSiO_3$ (133)

$K_2Hg(SO_3)_2$ (14)

$K_2Hg(CN)_4$ (122)

$KCu(CN)_2$ (85)

$KCu_2(CN)_3$ (85)

$K_3Cu(CN)_4$ (85)

$K_6Cu_2(CN)_8$ (272)

$KAg(CN)_2$ (155)

K_2PtCl_4 (204)

N_w	$\Delta t/N$
0.03	5.12
.06	4.62
.08	4.51
.20	4.47

$KMnO_4$ (20, 187, 278)

0.005	3.600
.006	3.590
.01	3.570
.02	3.554
.19E*	3.05

* Ice + $KMnO_4$.

$K_2[Fe(CN)_5NO]$ (33)

N_v	$\Delta t/N$
0.04	5.15
.07	4.83
.10	4.64
.20	4.36

$K_3Fe(CN)_6$ (20, 92, 138, 187)

N_w	$\Delta t/N$
0.0005	7.3
.001	7.10
.002	6.87
.005	6.53
.01	6.26
.02	5.98
.05	5.60
.10	5.30

$K_3Fe(CN)_6$.—(Continued)

N_w	$\Delta t/N$
0.20	5.00
.50	4.55

E:* Δt = 3.9°

* Ice + $K_3Fe(CN)_6$.

$K_4Fe(CN)_6$ (92, 187, 188, 294)

0.0075	6.9
.0125	6.57
.025	6.17
.05	5.72
.075	5.41
.10	5.18
.125	5.00
.191	4.80
.363E*	4.52

* Ice + $K_4Fe(CN)_6.3H_2O$.

$Co(NH_3)_2(NO_2)_4K$ (97)

0.002	3.68
.005	3.652
.01	3.620
.02	3.573

$K_3(COS)_6Co$ (234)

$K_3Co(CN)_6$ (138)

0.01	5.7
.02	5.2
.05	4.7

$K_2Ni(CN)_4$ (138)

0.06	5.1
.10	5.0
.20	4.8
.50	4.4

K_2CrO_4 (42, 43, 89, 143, 251)

0.5	3.0
1.0	3.3
1.5	3.47
2.0	3.6
2.5	3.74
2.81–	3.81–
2.97E*	3.84

* Ice + K_2CrO_4.

$K_2Cr_2O_7$ (20)

0.0005	7.25
.001	7.06
.002	6.73
.004	6.38
(2)	
.0502	5.38
.1009	4.85
(143)	
.153E*	4.12

* Ice + $K_2Cr_2O_7$.

$CrK(SO_4)_2$ (127)

$K_3Cr(C_2O_4)_3$ (138)

$K_2Mo_2O_8$ (182)

KVO_3 (63)

$3KCNS.V(CNS)_3$ (41)

KBO_2 (172)

N_v	$\Delta t/N$
0.015	3.8
.030	3.63
.05	3.51

KBO_2.—(Cont'd)

N_v	$\Delta t/N$
0.10	3.36
.20	3.26

$K_2B_4O_6$ (228)

$K_2B_4O_7$ (172)

0.01	11.0
.02	9.8
.05	8.14
.10	6.83
.125	6.38

$KBOC_4H_4O_6$ (131)

$AlK(SO_4)_2$ (243)

N_w	$\Delta t/N$
0.0206	4.61
.0458	4.08
.1147	3.66

$KNaSO_3$ (14)

$KNaC_4H_4O_6$ (105)

N_v	$\Delta t/N$
0.02–0.07	4.7–4.0

RbF (65)

N_w	$\Delta t/N$
0.12– 0.27	3.45± 0.05

$RbHF_2$ (65)

0.13– 0.27	3.7 ± 0.2

RbCl (23)

0.1	3.47
.2	3.40
.5	3.30
.8	3.26

Rb_2SO_4 (58)

0.02	5.55
.05	5.15
.10	4.62
.16	4.26

$RbNO_3$ (23)

0.05	3.45
.10	3.34
.20	3.19
.50	2.88
.83	2.64

Rb_2SiO_3 (133)

N_v	$\Delta t/N$
0.01– .015	9.4–8.9

$RbCu(CN)_2$ (85)

$Rb_2Cu_3(CN)_5$ (85)

CsCl (23, 111, 187)

N_w	$\Delta t/N$
0.02	3.586
.05	3.515
.10	3.454
.20	3.385
.30	3.339
.40	3.304
.50	3.275

CsI (74)

1.475E*	2.71

* Ice + CsI.

Cs_2SO_4 (58)

0.0120	5.40
.0232	4.96
.0480	4.77
1592	4.20

$CsNO_3$ (108, 242, 281, 282)

N_w	$\Delta t/N$
0.001	3.66
.005	3.63
.01	3.585
.025	3.476
.05	3.387

$CsNO_3$.—(Cont'd)

N_w	$\Delta t/N$
0.10	3.276
.20	3.108
.30	2.992
.437E*	2.870

* Ice + $CsNO_3$.

Cs_2SiO_3 (133)

N_v	$\Delta t/N$
0.0104	6.5
.0156	6.5

Solutions of More Than One Solute Where at Least One of the Solutes is a Strong Electrolyte

B-Table

Standard arrangement (*v.* Vol. III, p. viii)

H_2O_2-H_2SO_4 (221)
H_2O_2-$(NH_4)_2SO_4$ (123, 128)
H_2O_2-H_3BO_3 (172)
H_2O_2-NaOH (36)
H_2O_2-$NaBO_2$ (172)
H_2O_2-KNO_3 (123, 128)
H_2O_2-K_2SO_4 (136)
H_2O_2-$K_2B_4O_7$ (172)
HF-H_3BO_3 (3)
HCl-NH_4OH (46)
HCl-$CdCl_2$ (49)
HCl-$HgCl_2$ (155)
HCl-NaOH (46)
$HClO_3$-KOH (46)
$HClO_4$-NaOH (46)
HBr-$CdBr_2$ (49)
I_2-HI (193)
I_2-CdI_2 (275)
I_2-KI (155, 193)
HI-I_2 (193)
HI-CdI_2 (48)
HIO_3-KOH (47)
HIO_4-NaOH (47)
HIO_4-KOH (47)
SO_2-KI (279)
H_2SO_4-H_2O_2 (221)
H_2SO_4-NH_4OH (46)
H_2SO_4-KOH (46)
$H_2S_2O_6$-NaOH (47)
H_2SeO_3-KOH (47)
NH_4OH-HCl (46)
NH_4OH-H_2SO_4 (46)
NH_4OH-H_3PO_2 (46)
NH_4OH-H_3PO_3 (46)
NH_4OH-H_3PO_4 (46)
NH_4OH-$H_4P_2O_7$ (47)
NH_4OH-H_3AsO_3 (46)
NH_4OH-H_3AsO_4 (46)
NH_4OH-AgCl (25)
NH_4OH-H_3BO_3 (47)
NH_4NO_2-$Cd(NO_2)_2$ (52)
NH_4NO_2-$Ni(NO_2)_2$ (52)
NH_4NO_3-$Pr(NO_3)_3$ (122)
NH_4Cl-$CdCl_2$ (49)
NH_4Cl-$HgCl_2$ (126)
NH_4Br-$CdBr_2$ (49)
NH_4I-CdI_2 (48)
$(NH_4)_2SO_4$-H_2O_2 (123, 128)
$(NH_4)_2SO_4$-$CuSO_4$ (122)
$(NH_4)_2SO_4$-$CdSO_4$ (122)
H_3PO_2-NH_4OH (46)
H_3PO_2-NaOH (46)
H_3PO_3-NH_4OH (46)
H_3PO_3-NaOH (46)
H_3PO_4-NH_4OH (46)
H_3PO_4-NaOH (46)
$H_4P_2O_6$-KOH (47)
$H_4P_2O_7$-NH_4OH (47)
$H_4P_2O_7$-KOH (47)
H_3AsO_3-NH_4OH (46)
H_3AsO_3-KOH (46)
H_3AsO_4-NH_4OH (46)
H_3AsO_4-NaOH (46)
C_2H_6O-HCl (292)
Methyl ether
$C_6H_5NH_2$-C_6H_5-NH_2.HCl (296)
$C_9H_8N_2$-HCl (181)
3-Aminoquinoline
$N(CH_3)_4NO_2$-$Hg(NO_2)_2$ (229)
$PbC_4H_4O_6$-KOH (131)
$TlNO_2$-$Cd(NO_2)_2$ (52)
$TlNO_2$-$Ni(NO_2)_2$ (52)
$ZnCl_2$-NaCl (126)
$ZnCl_2$-KCl (126)
$ZnSO_4$-$(NH_4)_2SO_4$ (138)
$CdCl_2$-HCl (49)
$CdCl_2$-NH_4Cl (49)
$CdCl_2$-$SrCl_2$ (126)
$CdCl_2$-NaCl (49)
$CdCl_2$-KCl (49, 126, 138)
$CdBr_2$-HBr (49)
$CdBr_2$-NH_4Br (49)
$CdBr_2$-NaBr (49)
$CdBr_2$-KBr (49)
CdI_2-I_2 (275)
CdI_2-HI (48)
CdI_2-NH_4I (48)
CdI_2-NaI (48)
CdI_2-KI (48)
$CdSO_4$-$(NH_4)_2SO_4$ (122)
$Cd(NO_2)_2$-NH_4NO_2 (52)
$Cd(NO_2)_2$-$TlNO_2$ (52)
$Cd(NO_2)_2$-$Ni(NO_2)_2$ (52)
$Cd(NO_2)_2$-KNO_2 (52)
$HgCl_2$-HCl (155)
$HgCl_2$-NH_4Cl (126)
$Hg(NO_2)_2$-$N(CH_3)_4NO_2$ (229)
$Hg(NO_2)_2$-$Ni(NO_2)_2$ (53)
$Hg(NO_2)_2$-$Ca(NO_2)_2$ (229)
$Hg(NO_2)_2$-$Ba(NO_2)_2$ (229)
$Hg(NO_2)_2$-$NaNO_2$ (229)
$Hg(NO_2)_2$-KNO_2 (53, 229)
$Hg(CN)_2$-KCN (262)
$CuCl_2$-NH_4Cl (125)
$CuCl_2$-$CdCl_2$ (22)
$CuSO_4$-$(NH_4)_2SO_4$ (122)
$CuSO_4$-$C_4H_8O_2$ Ethyl acetate (233)
$CuSO_4$-$C_{12}H_{22}O_{11}$ Sucrose (233)
$CuSO_4$-$Na_2S_2O_3$ (64)
$CuC_4H_4O_6$-KOH (131)
AgCl-NH_3 (25)
AgBr-$Na_2S_2O_3$ (231)
FeF_3-NaF (203)
$FeSO_4$-$(NH_4)_2SO_4$ (138)
$Ni(NO_2)_2$-NH_4NO_2 (52)
$Ni(NO_2)_2$-$TlNO_2$ (52)
$Ni(NO_2)_2$-$Cd(NO_2)_2$ (52)
$Ni(NO_2)_2$-$Hg(NO_2)_2$ (53)
$UO_2(NO_3)_2$-NaCl (56)
$UO_2(NO_3)_2$-$NaC_2H_3O_2$ (56)
$UO_2(NO_3)_2$-$NaC_2H_2ClO_2$ (56) Monochloroacetate
$UO_2(NO_3)_2$-$Na_2C_2O_4$ (56)

$UO_2(C_2H_3O_2)_2$-$NaC_2H_3O_2$ (56)
$UO_2(NO_3)_2$-$Na_3C_6H_5O_7$ (56) Citrate
H_3BO_3-H_2O_2 (172)
H_3BO_3-HF (3)
H_3BO_3-NH_4OH (47)
H_3BO_3-$C_6H_{14}O_6$ Mannitol (166)
H_3BO_3-NaOH (47)
H_3BO_3-KOH (47)
H_3BO_3-KF (3)
$AlCl_3$-NaCl (126)
$Pr(NO_3)_3$-NH_4NO_3 (122)
$MgCl_2$-HCl (55)
$MgCl_2$-NH_4Cl (126)
$MgCl_2$-$C_4H_8O_2$ (233) Ethyl acetate
$MgCl_2$-$C_{12}H_{22}O_{11}$ Sucrose (233)
$MgSO_4$-$(NH_4)_2SO_4$ (138)
$MgSO_4$-$C_2H_5NO_2$ Glycocoll (290)
$Mg(NO_3)_2$-HNO_3 (55)
$Mg(NO_3)_2$-$C_4H_8O_2$ Ethyl acetate (233)
$Mg(NO_3)_2$-$C_{12}H_{22}O_{11}$ Sucrose (233)
$CaBr_2$-Br_2 (175)
CaI_2-I_2 (175)
$Ca(NO_2)_2$-$Hg(NO_2)_2$ (229)
$Sr(OH)_2$-Al (104)
$SrCl_2$-$C_2H_5NO_2$ Glycocoll (208, 290)
$SrCl_2$-$CdCl_2$ (126)
$SrBr_2$-Br_2 (175)
$SrBr_2$-I_2 (175)
$SrBr_2$-$C_2H_5NO_2$ Glycocoll (208, 290)
SrI_2-I_2 (175)
$Sr(NO_3)_2$-$C_2H_5NO_2$ Glycocoll (208, 290)
$Ba(OH)_2$-Al (104)
$BaCl_2$-$C_2H_5NO_2$ Glycocoll (290)
$BaBr_2$-Br_2 (175)
$BaBr_2$-$C_4H_8O_2$ (233) Ethyl acetate
$BaBr_2$-$C_{12}H_{22}O_{11}$ Sucrose (233)
$BaBr_2$-$C_2H_5NO_2$ Glycocoll (290)
BaI_2-I_2 (124)
$Ba(NO_2)_2$-$Hg(NO_2)_2$ (229)
$Ba(NO_3)_2$-$C_4H_8O_2$ Ethyl acetate (233)
$Ba(NO_3)_2$-$C_{12}H_{22}O_{11}$ Sucrose (233)
$Ba(NO_3)_2$-$C_2H_5NO_2$ Glycocoll (290)
LiCl-$C_4H_8O_2$ (233) Ethyl acetate
LiCl-$C_{12}H_{22}O_{11}$ (233) Sucrose
LiCl-$C_2H_5NO_2$ Glycocoll (208, 290)
LiBr-$C_2H_5NO_2$ (290)
NaOH-H_2O_2 (36)
NaOH-HCl (46)
NaOH-$HClO_4$ (46)
NaOH-HIO_4 (47)
NaOH-$H_2S_2O_6$ (47)
NaOH-H_3PO_2 (46)
NaOH-H_3PO_3 (46)
NaOH-H_3PO_4 (46)
NaOH-H_3AsO_4 (46)
NaOH-CrO_3 (47)
NaOH-H_3BO_3 (47, 103)
NaOH-$Al(OH)_3$ (103, 189)
NaF-FeF_3 (203)
NaF-$FeCl_2$ (203)
NaF-$FeCl_3$ (203, 239)
NaCl-HCl (13, 55)
NaCl-$C_4H_8O_2$ (233) Ethyl acetate
NaCl-$C_{12}H_{22}O_{11}$ Sucrose (233)
NaCl-$C_2H_5NO_2$ Glycocoll (290)
NaCl-$ZnCl_2$ (126)
NaCl-$CdCl_2$ (49)
NaCl-$HgCl_2$ (155)
NaCl-$UO_2(NO_3)_2$ (56)
NaCl-$AlCl_3$ (126)
NaCl-KCl (13, 49)
NaBr-$C_4H_8O_2$ (233) Ethyl acetate
NaBr-$C_{12}H_{22}O_{11}$ Sucrose (233)
NaBr-$C_2H_5NO_2$ Glycocoll (290)
NaBr-$CdBr_2$ (49)
NaI-$C_2H_5NO_2$ (290) Glycocoll
NaI-CdI_2 (48)
NaI-KI (48)
$NaIO_3$-KIO_3 (93)
Na_2SO_4-K_2SO_4 (6, 98)
$Na_2S_2O_3$-AgBr (231)
$Na_2S_2O_3$-$CuSO_4$ (64)
$Na_2S_2O_3$-$AgNaS_2O_3$ (14)
NaHS-NaOH (46)
$NaNO_3$-H_2O_2 (120)
$NaNO_3$-$C_4H_8O_2$ Ethyl acetate (233)
$NaNO_3$-$C_{12}H_{22}O_{11}$ Sucrose (233)
$NaNO_3$-$C_2H_5NO_2$ Glycocoll (290)
$NaNO_3$-$Pb(NO_3)_2$ (155)
$Na_2C_2O_4$-$UO_2(NO_3)_2$ (56)
$NaC_2H_3O_2$-UO_2-$(C_2H_3O_2)_2$ (56)
$NaC_2H_3O_2$-$UO_2(NO_3)_2$ (56)
$Na_3C_6H_5O_7$-$UO_2(NO_3)_2$ (56) Citrate
$NaC_2H_2ClO_2$-$UO_2(NO_3)_2$ (56) Monochloroacetate
$NaBO_2$-H_2O_2 (172)
KOH-$HClO_3$ (46)
KOH-HIO_3 (47)
KOH-HIO_4 (47)
KOH-H_2SO_4 (46)
KOH-H_2SeO_3 (47)
KOH-$H_4P_2O_6$ (47)
KOH-$H_4P_2O_7$ (47)
KOH-H_3AsO_3 (46)
KOH-$PbC_4H_4O_6$ (131)
KOH-$CuC_4H_4O_6$ (131)
KOH-H_3BO_3 (3)
KCl-H_2O_2 (123, 128)
KCl-HCl (55)
KCl-$C_4H_8O_2$ (233) Ethyl acetate
KCl-$C_6H_{14}O_6$ (98) Mannitol
KCl-$C_{12}H_{22}O_{11}$ (233) Sucrose
KCl-$C_2H_5NO_2$ (290) Glycocoll
KCl-$ZnCl_2$ (126)
KCl-$CdCl_2$ (49, 126, 138)
KCl-$HgCl_2$ (155)
KCl-$CuCl_2$ (121, 125)
KCl-$MgCl_2$ (55, 138)
KCl-$BaCl_2$ (138)
KCl-NaCl (13, 49)
KCl-dextrin, gum arabic, tannic acid, glycerol and albumen (297)
KBr-$C_4H_8O_2$ (233) Ethyl acetate
KBr-$C_{12}H_{22}O_{11}$ (233) Sucrose
KBr-$C_2H_5NO_2$ Glycocoll (290)
KBr-$CdBr_2$ (49)
KBr-$HgBr_2$ (262)
KI-I_2 (155, 193, 201)
KI-SO_2 (279)
KI-$C_4H_8O_2$ (233) Ethyl acetate
KI-$C_{12}H_{22}O_{11}$ (233) Sucrose
KI-$C_2H_5NO_2$ Glycocoll (208, 290)
KI-CdI_2 (48, 122)
KI-HgI_2 (262)
KI-NaI (48)
KIO_3-$NaIO_3$ (93) Equimolal mixture

N_w	$\Delta t/N$
0.01	3.565
.02	3.515
.05	3.408
.10	3.277

K_2SO_4-H_2O_2 (136)
K_2SO_4-$(NH_4)_2SO_4$ (138)
K_2SO_4-$C_4H_8O_2$ Ethyl acetate (233)
K_2SO_4-C_6H_6O (194) Phenol
K_2SO_4-$C_6H_{14}O_6$ Mannitol (194)
K_2SO_4-$C_{12}H_{22}O_{11}$ Sucrose (233)
K_2SO_4-Na_2SO_4 (6, 98)
K_2SO_4-dextrin, gum arabic and tannic acid (297)
KHS-NaOH (47)
KNO_2-$Cd(NO_2)_2$ (52)
KNO_2-$Hg(NO_2)_2$ (53, 229)
KNO_2-$Ni(NO_2)_2$ (52, 53)
KNO_3-H_2O_2 (120, 123)
KNO_3-HNO_3 (55)
KNO_3-$C_4H_8O_2$ (233) Ethyl acetate
KNO_3-$C_{12}H_{22}O_{11}$ Sucrose (233)
KNO_3-$C_2H_5NO_2$ Glycocoll (290)
KNO_3-$Pb(NO_3)_2$ (155)
KNO_3-KCl (93) Equimolal mixture

N_w	$\Delta t/N$
0.01	3.60
.02	3.555
.05	3.468
.10	3.390
.20	3.283

KNO_3-dextrin and gum arabic (297)
K_2HPO_4-dextrin, gum arabic and tannic acid (297)
KCN-$Hg(CN)_2$ (262)
KCN-AgCN (155)
$K_2B_4O_7$-H_2O_2 (172)

NON-ELECTROLYTES, WEAK ELECTROLYTES AND ALL ORGANIC COMPOUNDS

For abbreviations, *v.* p. 254

Miles S. Sherrill Assisted by Louis Harris

Solutions Containing One Solute

𝔅-Table

Standard arrangement (*v.* Vol. III, p. viii)

H_2O_2 (164, 172)

N_w	$\Delta t/N$
0.4	1.86
5.0	1.92
10.0	2.02
15.0	2.10
20.0	2.15
*ca.*24.0E	2.17

HF (137)

N_w	$\Delta t/N$
0.3	2.0
1.0	1.9
3.0	2.0

Cl_2 (246)

N_w	$\Delta t/N$
0.005	4.4
.01	4.18
.03	3.54
.05	3.15
.07	2.92

HClO (113)

N_w	$\Delta t/N$
0.25	1.87
.50	1.86

Br_2 (246)

N_w	$\Delta t/N$
0.006	2.02
.01	1.97
.02	1.90
.04	1.88
.10	1.87
.15	1.865

I_2 (247)

N_w	$\Delta t/N$
0.00074	2.0

H_2S (78)

N_w	$\Delta t/N$
0.08	2.5
.2	2.0

H_2SO_3 (7, 279)

N_w	$\Delta t/N$
0.1	2.5
0.5	2.3
1.0	2.3

SeO_2 (167)

N_w	$\Delta t/N$
0.1	2.22
1.0	1.93
3.0	1.83
5.0	1.81
7.0	1.83
9.0	1.88
10.0	1.91
12	1.95

H_6TeO_6 (86)

N_w	$\Delta t/N$
0.1	2.0
.2	2.0

NH_3 (252, 264, 265)

N_w	$\Delta t/N$
0.5	1.86
2.0	1.9
5.0	2.0
10.0	2.2
15.0	2.5
20.0	2.9
25.0	3.3
30E*	3.7

* Ice + $NH_3.H_2O$.

H_3PO_2 (205)

N_w	$\Delta t/N$
0.2	2.80
0.5	2.59
1.0	2.45

H_3PO_3 (7, 226)

N_w	$\Delta t/N$
0.1	2.9
0.5	2.5
1.0	2.4

H_3PO_4 (38, 137, 160)

N_w	$\Delta t/N$
0.05	2.55
.10	2.36
.20	2.26
.50	2.2
1.0	2.3
1.5	2.5
2.0	2.7

$H_4P_2O_6$ (45)

N_w	$\Delta t/N$
0.2	3.4
.4	3.2
.6	3.2

CO_2 (78)

N_w	$\Delta t/N$
0.05	2.1
.08	2.1

H_3BO_3 (7, 134, 185)

N_w	$\Delta t/N$
0.05	2.0
.40	2.0

$(C_2H_5)_4Fe(CN)_6$ (31)

N_w	$\Delta t/N$
0.03	1.95
.10	1.90

ℭ-Table

The ℭ-Arrangement (*v.* Vol. III, p. viii)

CH_2N_2 (220) Cyanamide

N_w	$\Delta t/N$
0.5	1.80
1.0	1.73
2.0	1.61
5.0	1.41
10.0	1.22

CH_2O_2 (1, 69) Formic acid

N_w	$\Delta t/N$
1.0	1.83

CH_2O_2.—(*Cont'd*)

N_w	$\Delta t/N$
2.0	1.78
3.0	1.75
4.0	1.71
5.0	1.69
10	1.5
20	1.3
30	1.2
40	1.1

CH_3NO (66, 280)
Formamide

0.5	1.86
5.0	1.7
10.0	1.4
20.0	1.2
40.0	1.1

CH_4N_2O (72, 100)
Urea

0.005	1.850
.010	1.850
.040	1.850
.500	1.863

CH_4N_2S (241)
Thiourea

0.2	1.82
.4	1.72

CH_4O (1, 17, 162, 213)
Methyl alcohol

0.01	1.82
0.1	1.81
0.2	1.81
2.0	1.86
4.0	1.90
6.0	1.93
10.0	2.00
20.0	1.9
30	1.8
45	1.6
60	1.5
70	1.4

$C_2HCl_3O_2$ (287)
Trichloroacetic acid

0.005 to 0.04	3.5

$C_2H_2Cl_2O_2$ (100, 205)
Dichloroacetic acid

0.004	3.69
.010	3.56
.02	3.45
.05	3.23
.10	3.00
.20	2.80
.50	2.51

$C_2H_2N_8$ (191)
Bistetrazole

0.02	3.9
.05	3.0
.10	2.1
.12	1.8

$C_2H_2O_4$ (61, 161, 226, 244)
Oxalic acid

0.02	3.40
.05	3.04

$C_2H_2O_4$.—(*Cont'd*)

N_w	$\Delta t/N$
0.10	2.84
.20	2.64
.30	2.58

$C_2H_3Br_3O_2$ (7)
Bromal hydrate

0.05	1.9
.70	1.9

$C_2H_3Cl_3O_2$ (1, 162, 241)
Chloral hydrate

0.01	1.86
.10	1.86
1.00	1.86
1.50	1.89
2.00	1.93

C_2H_4O (170)
Ethylene oxide

1.0	1.7

$C_2H_4O_2$ (1, 54, 69, 137, 237, 241)
Acetic acid

0.1	1.90
.3	1.86
.7	1.81
1.0	1.79
5.0	1.6
10.0	1.4
18.0	1.2
23.95E	1.1

$C_2H_4O_2$ (1)
Methyl formate

0.3	1.87
.5	1.82
1.0	1.83
1.5	1.88

C_2H_5NO (163)
Acetamide

0.01	1.83
.10	1.83
.20	1.82
1.00	1.81

$C_2H_5NO_2$ (142, 241)
Glycocoll

0.1	1.85
.3	1.80
.6	1.74
.9	1.69

C_2H_6O (1, 162, 213, 227)
Ethyl alcohol

0.02	1.83
.1	1.83
1.0	1.83
2.0	1.84
4.0	1.93
6.0	2.05
7.0	2.12
10.0	2.2
15.0	2.0
20.0	1.8
30	1.4
40	1.2
50	1.0
70	0.9

C_2H_6O (292)
Methyl ether

N_w	$\Delta t/N$
0.2	1.9

C_2H_6OS (21)
Thioethylene glycol

C_2H_7N (202)
Ethylamine

0.5	1.9
1.0	1.8
1.5	1.8

C_2H_7NO (8)
Aldehyde ammonia

0.67	0.68*
.67	0.90†

* Freezing-point observation taken at once.
† At equilibrium after 27 hours.

$C_3HCl_3O_2$ (27)
Trichloroacrylic acid

0.08	3.42
.10	3.07
.27E	2.2

$C_3H_6N_2O_2$ (218)
Methylglyoxime

0.1	1.8

C_3H_6O (1)
Allyl alcohol

0.5	1.79
1.0	1.76
2.0	1.77
3.0	1.78
4.5	1.77
5.0	1.76
6.0	1.72
7.0	1.66
7.5	1.62

C_3H_6O (1, 162)
Acetone

0.02	1.86
0.10	1.85
1.0	1.79
4.0	1.65
7.0	1.52

$C_3H_6O_2$ (1, 69, 202)
Propionic acid

0.1	2.00
.2	1.92
.4	1.85
1.0	1.73
4.0	1.39
8.0	1.0
10.0	0.9
20	0.6
30	0.5
50	0.4
90	0.3

$C_3H_6O_2$ (1)
Ethyl formate

0.2	1.90
0.4	1.92
1.0	1.98

$C_3H_6O_2$ (1)
Methyl acetate

0.3	1.83
1.7	1.83

$C_3H_6O_3$ (137)
β-Hydroxypropionic acid

N_w	$\Delta t/N$
1.0	1.85
2.0	1.84
3.0	1.83

$C_3H_6O_3$ (137)
Lactic acid

0.5	1.96
1.0	1.95
2.0	1.93
2.5	1.92

C_3H_7NO (18)
Acetoxime

0.1	1.8
2.0	1.6

$C_3H_7NO_2$ (171)
Urethane

0.2	1.9
.5	1.8

C_3H_8O (1, 162)
n-Propyl alcohol

0.01	1.86
.05	1.84
.10	1.83
.60	1.80
1.00	1.79
1.50	1.78
2.00	1.79
3.00	1.82
3.50	1.83
4.0	1.82
5.0	1.76
6.0	1.64
7.0	1.49
8.0	1.32

C_3H_8O (1)
Isopropyl alcohol

1.0	1.70
2.0	1.73
3.0	1.80
4.0	1.89
5.0	1.98
6.0	2.07
8.0	2.03

$C_3H_8O_3$ (1, 102, 154, 162, 223)
Glycerol

0.01	1.86
.20	1.87
.50	1.89
1.00	1.92
1.20	1.93
1.50	1.95
2.50	2.0
5.0	2.1
13.9E*	2.0
22.0E†	2.1

* (223). † (154).

C_3H_9N (202)
Propylamine

0.4	2.0
.6	1.9
.8	1.8

$C_4H_4O_4$ (199)
Fumaric and maleic acids

$C_4H_5Cl_3O_2$ (59)
α, α, β-Trichlorobutyric acid

N_w	$\Delta t/N$
0.12	3.27
.15	3.12
.20	3.07

$C_4H_5Cl_6NO_2$ (8)
Dihydroxy-bistrichloroethylideneimine

0.4	5.4
.6	5.1

$C_4H_6O_4$ (161)
Succinic acid

0.01	1.99
.05	1.93
.10	1.89
.20	1.88

$C_4H_6O_6$ (1, 61, 137, 161)
d-Tartaric acid

0.01	2.34
.05	2.12
.10	2.05
.20	1.98
.50	1.94
.80	1.95
1.50	2.01
3.00	2.14
4.00	2.24
5.00	2.35

$C_4H_7Cl_3O_2$ (18)
Chloral alcoholate

0.1	3.5
1.0	3.0

$C_4H_8O_2$ (196)
Glycol ether

0.1	1.86
1.0	1.86
2.0	1.85
5.0	1.81
10.0	1.55

$C_4H_8O_2$ (69, 202)
n-Butyric acid

0.2	1.97
.4	1.83
.8	1.70
1.0	1.67
1.5	1.63
2.0	1.43
3.0	0.89
4.0	0.76

$C_4H_8O_2$ (69)
Isobutyric acid

5.0	0.170
15.0	0.140
20.0*	0.135

* Limit of miscibility.

$C_4H_8O_2$ (233)
Ethyl acetate

0.06	1.86
.10	1.85

$C_4H_8O_2$.—(*Cont'd*)

N_w	$\Delta t/N$
0.20	1.83
.50	1.82
.60	1.82

$C_4H_{10}O$ (162)
n-Butyl alcohol

0.01	1.89
.02	1.84
.05	1.84
.10	1.85
.20	1.83

$C_4H_{10}O$ (162)
Ethyl ether

0.01	1.67
.02	1.67
.05	1.70
.10	1.72
.20	1.70

$C_4H_{10}O_4$ (93, 223)
Erythritol

0.010	1.852
.020	1.857
.040	1.860
.100	1.866
.200	1.873
.400	1.885
.500	1.890
1.7E	2.6

C_5H_5N (144, 213)
Pyridine

0.1	1.79
0.4	1.66
1.0	1.43
2.0	1.15
2.5	1.03
5.0	0.7
10.0	0.5
15.0	0.5
20.0	0.6
50.0	0.90

$C_5H_6O_4$ (199)
Citraconic, mesaconic, and itaconic acids

$C_5H_{10}O_5$ (165)
β,-*l*-Arabinose

$C_5H_{12}O$ (162)
Isoamyl alcohol

N_w	$\Delta t/N$
0.01	1.85
.02	1.86
.05	1.84
.10	1.82

$C_5H_{13}N$ (202)
Isoamylamine

0.1	1.9
.8	1.8

$C_6H_3N_3O_7$ (248)
Picric acid

0.005	3.82
.010	3.63
.020	3.28
.0422E	3.14

C_6H_6O (202, 230, 249)
Phenol

N_w	$\Delta t/N$
0.1	1.81
.2	1.83
.5	1.63
.56E*	1.5
.74mE†	1.6

* Ice and phenol hydrate.
† Ice and phenol.

$C_6H_6O_2$ (288)
Resorcinol

C_6H_7N (162, 202)
Aniline

N_w	$\Delta t/N$
0.01	1.85
.05	1.82
.10	1.79
.20	1.73
.40	1.63

$C_6H_8N_2$ (24)
Phenylhydrazine

0.3	1.4
.5E*	1.5

* Ice and hydrate.

$C_6H_8O_7$ (1, 137, 147, 161)
Citric acid

0.01	2.26
.02	2.14
.05	2.08
.10	2.03
.50	1.93
1.00	1.94
1.50	1.96
2.00	2.00
3.00	2.18
4.7E	2.6

$C_6H_{12}O_6$ (162, 241)
Dextrose

0.05	1.86
.10	1.86
.20	1.87
40	1.89
.80	1.91
1.00	1.92

$C_6H_{12}O_6$ (165)
α, d-Galactose

$C_6H_{12}O_6$ (163)
Levulose

0.02	1.87
.20	1.87

$C_6H_{14}O_2$ (18)
Acetal

N_w	$\Delta t/N$
0.1	1.9
2.0	1.9

$C_6H_{14}O_2$ (223)
Pinacone

$C_6H_{14}O_6$ (163, 199)
Dulcitol

N_w	$\Delta t/N$
0.01-0.10	1.86

$C_6H_{14}O_6$ (4, 28, 93)
Mannitol

0.005	1.853
.010	1.854
.020	1.855
.040	1.856
.050	1.857
.070	1.858
.1000	1.859
.2709	1.864
.5460E	1.866

$C_6H_{15}N$ (202)
Dipropylamine

0.2	1.9
.4	1.8
.8	1.8

$C_7H_5NO_4$ (287, 289)
o-Nitrobenzoic acid

0.005	0.33
.010	0.31
.015	0.29

C_7H_9N (202)
Benzylamine

0.1	2.1
.2	2.0
.3	1.9
.5	1.6

$C_7H_{10}Cl_2O_5$ (95)
β-Dechloro-*p*-arabinochloralose

$C_7H_{14}O_6$ (255)
α-Methyl glucoside

0.6	2.06
1.0	2.16
2.0	2.35
3.0	2.51
4.0	2.64
4.63E*	2.72

* Ice and anhydrous glucoside.

$C_8H_{12}Cl_2O_6$ (95)
β-Dechloro-*p*-galactochloralose

$C_9H_8O_2$ (176)
Allocinnamic acid

M. P.	N_w	$\Delta t/N$
42	0.034E	1.9
58	0.029E	1.9
68	0.026E	1.8

$C_{12}H_{22}O_{11}$ (80, 163)
Maltose

N_w	$\Delta t/N$
0.05	1.87
.20	1.89
.40	1.92
1.00	2.03

$C_{12}H_{22}O_{11}$ (67, 70, 100, 147, 162, 227, 233, 255)
Sucrose

0.005	1.86
.05	1.87
.10	1.88
.20	1.90
.40	1.94
.50	1.96
.70	2.00
1.00	2.06
1.20	2.10
1.50	2.17
2.0	2.3
3.0	2.5
4.0	2.7

$C_{12}H_{22}O_{11}.H_2O$ (163)
Lactose

0.01	1.86
.10	1.86
.20	1.88

$C_{12}H_{24}O_{11}$ (260)
Lactositol

$C_{13}H_{18}O_7$ (163)
Salicin

N_w	$\Delta t/N$
0.02	1.86

$C_{17}H_{22}ClNO_4$ (258)
Cocaine hydrochloride

$C_{22}H_{25}NO_6$ (79)
Colchicine

Solutions of More Than One Solute

Boric acid + hydrogen peroxide (172)
Boric acid + mannitol (166)
Ethyl alcohol + acetone (70)
Ethyl alcohol + glycerol (70)
Sucrose + glycerol (70)
Sucrose + citric acid (147)
Sucrose + methyl alcohol (1)

LITERATURE

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(1) Abegg, *7*, **15**: 209; 94. (2) Abegg and Cox, *7*, **48**: 725; 04. (3) Abegg, Fox and Herz, *93*, **35**: 129; 03. (4) Adams, *1*, **37**: 481; 15. (5) Anthony and Hudleston, *4*, **127**: 1122; 25. (6) Archihald, *292*, **10**: 33; 03. (7) Arrhenius, *7*, **2**: 491; 88. (8) Aschau, *25*, **48**: 874; 15. (9) Bakhuis Roozeboom, *70*, **3**: 29; 84.

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(50) Cottrell, *50*, **4**: 637; 00. (51) Cottrell, *76*, **1901**: 1035. (52) Cuttica, *36*, **52 I**: 210; 22. (53) Cuttica and Carohhi, *36*, **52 II**: 270; 22. (54) Dahms, *8*, **60**: 119; 97. (55) Dernby, *147*, **3**: No. 18; 16. (56) Dittrich, *7*, **29**: 449; 99. (57) Donnan and Burt, *4*, **83**: 335; 03. (58) Dreyers, *169*, **14**: 229; 10. *10*, **1**: 334; 10. (59) Drucker, *7*, **49**: 563; 04.

(60) Drucker, *9*, **17**: 398; 11. (61) Drucker, *7*, **96**: 381; 20. (62) Drucker, *9*, **28**: 463; 22. (63) Düllberg, *7*, **45**: 120; 03. (64) Dutoit, *42*, **11**: 650; 13. (65) Eggeling and Meyer, *93*, **46**: 174; 05. (66) English and Turner, *4*, **107**: 774; 15. (67) Ewan, *7*, **31**: 22; 99. (68) Falciola, *36*, **39 I**: 398; 09. (69) Faucon, *6*, **19**: 70; 10.

(70) Fawsitt, *4*, **115**: 790; 19. (71) Fernau, *93*, **17**: 327; 98. (72) Flügel, *7*, **79**: 577; 12. (73) Foerster, Brosche and Norberg-Schultz, *7*, **110**: 435; 24. (74) Foote, *11*, **29**: 203; 03. (75) Fraenckel, *93*, **55**: 223; 07. (76) Fricke and Schutzdeller, *93*, **131**: 130; 23. (77) Funk, *93*, **20**: 393; 99. (78) Garelli and Falciola, *36*, **34 II**: 1; 04. (79) Georgievics, *57*, **34**: 1851; 13.

(80) Gillis, *70*, **43**: 135; 24. (81) Giran, *34*, **146**: 1270; 08. (82) Goldblum and Terlikowski, *27*, **11**: 146; 12. (83) Goldschmidt and Syngros, *93*, **5**: 129; 94. (84) Groschuff, *93*, **47**: 331; 05. (85) Grossman and Forst, *93*, **43**: 94; 05. (86) Gutbier, *93*, **29**: 22; 02. (87) Guthrie, *3*, **49**: 1; 75. (88) Guthrie, *3*, **49**: 206; 75. (89) Guthrie, *3*, **49**: 266; 75.

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(110) Ishikawa and Kimura, *469*, **5**: 1; 26. (111) Jahn, *7*, **50**: 129; 05. (112) Jahn, *7*, **59**: 31; 07. (113) Jakowkin, *7*, **29**: 613; 99. (114) Jawein and Thillot, *25*, **22**: 654; 89. (115) Jellinek, *93*, **70**: 93; 11. (116) Jellinek and Czerwinski, *7*, **102**: 438; 22. (117) Jones, *7*, **11**: 110; 93. (118) Jones, *7*, **11**: 529; 93. (119) Jones, *7*, **12**: 623; 93.

(120) Jones, Barnes and Hyde, *11*, **27**: 22; 02. (121) Jones and Bassett, *11*, **34**: 290; 05. (122) Jones and Caldwell, *11*, **25**: 349; 01. (123) Jones and Carroll, *11*, **28**: 284; 02. (124) Jones and Getman, *7*, **49**: 385; 04. (125) Jones, Getman, Bassett, McMaster and Uhler, *152*, No. **60**: 07. (126) Jones and Knight, *11*, **22**: 110; 99. (127) Jones and Mackay, *11*, **19**: 83; 97. (128) Jones and Murray, *11*, **30**: 205; 03. (129) Jones and Pearce, *11*, **38**: 683; 07.

(130) Kablukov and Sachanov, *7*, **69**: 419; 09. (131) Kahlenberg, *7*, **17**: 577; 95. (132) Kahlenberg, *50*, **5**: 339; 01. (133) Kahlenberg and Lincoln, *50*, **2**: 77; 98. (134) Kahlenberg and Schreiner, *7*, **20**: 547; 96. (135) Kahlenberg and Schreiner, *7*, **27**: 552; 98. (136) Kazanetzkii, *53*, **46**: 1110; 14. (137) Kendall, Booge and Andrews, *1*, **39**: 2303; 17. (138) Kistyakovskii, *7*, **6**: 97; 90. (139) Klarmann, *93*, **132**: 289; 24.

(140) Klein and Svanberg, *147*, **4**: No. 1; 20. (141) Knight and Rich, *4*, **99**: 87; 11. (142) Kober and Sugiura, *11*, **48**: 383; 12. (143) Koppel and Blumenthal, *93*, **53**: 228; 07. (144) Kornfeld, *57*, **36**: 865; 15. (144.5) Kraus, Brown

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(150) Kremann and Kerschbaum, 93, **56**: 218; 07. (151) Kremann and Rodemund, 57, **35**: 1061; 14. (152) Küster and Heberlein, 93, **43**: 53; 05. (153) Küster, Heberlein and Kremann, 93, **41**: 1; 04. (154) Lane, 45, **17**: 924; 25. (155) Le Blanc and Noyes, 7, **6**: 385; 90. (156) Le Chatelier, 34, **124**: 1091; 97. (157) Levi, 36, **30 II**: 64; 00. (158) Lewis and Brighton, 1, **40**: 482; 18. (159) Loomis, 25, **26**: 797; 93. 2, **1**: 199, 274; 94. 8, **51**: 500; 94.
(160) Loomis, 8, **57**: 495; 96. (161) Loomis, 8, **60**: 523; 97. (162) Loomis, 7, **32**, 592; 00. (163) Loomis, 7, **37**: 407; 01. (164) Maass and Herzberg, 1, **42**: 2569; 20. (165) Mackenzie and Ghosh, 68, **35**: 22; 14. (166) Magnanini, 36, **21 II**: 134; 91. (167) Manchot and Ortner, 93, **120**: 301; 22. (168) Marchetti, 93, **19**: 391; 99. (169) Matignon, 34, **133**: 289; 01.
(170) Mazzucchelli and Armenante, 36, **52 I**: 338; 22. (171) Meldrum and Turner, 4, **97**: 1805; 10. (172) Menzel, 7, **105**: 402; 23. (173) Menzies and Potter, 1, **34**: 1452; 12. (174) Meusser, 25, **35**: 1414; 02. (175) Meyer, 93, **30**: 113; 02. (176) Meyer, 9, **17**: 976; 11. (177) Meyerhoffer, B3: 658. (178) Meyerhoffer, B3: 673. (179) Middelberg, 7, **43**: 305; 03.
(180) Milikan, 7, **92**: 59; 16. (181) Mills and Watson, 4, **97**: 741; 10. (182) Moeller, 7, **12**: 555; 93. (183) Mylius, 25, **34**: 2208; 01. (184) Mylius and Dietz, 93, **44**: 209; 05. (185) Nasini and Ageno, 7, **69**: 482; 09. (186) Nasini and Ageno, 36, **41 I**: 131; 11. (187) Noyes and Falk, 1, **32**: 1011; 10. (188) Noyes and Johnston, 1, **31**: 987; 09. (189) Noyes and Whitney, 7, **15**: 694; 94.
(190) Öholm, 7, **50**: 309; 05. (191) Oliveri-Mandalà, 36, **50 I**: 256; 20. (192) Orndorff and White, 12, **15**: 347; 93. (193) Osaka, 7, **38**: 743; 01. (194) Osaka, 7, **41**: 560; 02. (195) Oswald, 14, **1**: 32; 14. (196) Ounkovskaia, 53, **45**: 1099; 13. (197) Pascal, 34, **158**: 1672; 14. (198) Paternò, 36, **52 II**: 28; 22. 22, **31**: 166; 22. (199) Paternò and Nasini, 22, **41**: 685; 88.
(200) Paternò and Peratoner, 22, **6 II**: 306; 90. (201) Paternò and Peratoner, 36, **21 I**: 110; 91. (202) Peddle and Turner, 4, **99**: 685; 11. (203) Peters, 7, **26**: 193; 98. (204) Petersen, 7, **10**: 580; 92. (205) Petersen, 7, **11**: 174; 93. (206) Pfaundler and Schegg, 75, **71 II**: 351; 75. (207) Pfeiffer, 93, **29**: 107; 02. (208) Pfeiffer, Würgler and Witka, 25, **48**: 1938; 15. (209) Piccini and Brizzi, 83, **19**: 394; 99.
(210) Pickering, 4, **57**: 331; 90. (211) Pickering, 25, **25**: 1099; 92. (212) Pickering, 4, **63**: 890; 93. (213) Pickering, 4, **63**: 992; 93. (214) Pickering, 3, **36**: 111; 93. (215) Pickering, 25, **26**: 277; 93. (216) Pickering, 25, **26**: 2307; 93. (217) Ponsot, 34, **122**: 668; 96. 6, **10**: 79; 97. (218) Ponzio, 36, **51 II**: 213; 21. (219) Postma, 70, **39**: 515; 20.
(220) Pratolongo, 22, **23 I**: 46; 14. (221) Price, 4, **91**: 531; 07. (222) Prussia, 36, **28 II**: 113; 98. (223) Pushin and Glagoleva, 4, **121**: 2813; 22. (224) Randall and Vanselow, 1, **46**: 2418; 24. (225) Raoult, 7, **1**: 186; 87. (226) Raoult, 7, **2**: 488; 88. (227) Raoult, 34, **124**: 885; 97. **125**: 751; 97. 7, **27**: 617; 98. 6, **16**: 162; 99. (228) Rây, 4, **113**: 803; 18. (229) Rây and Mukherjee, 182, **26**: 173; 10.
(230) Rhodes and Markley, 50, **25**: 527; 21. (231) Richards and Faber, 11, **21**: 167; 99. (232) Rindell, 7, **70**: 452; 10. (233) Rivett, 7, **80**: 537; 12. 147, **2**: No. 9; 11. (234) Robinson and Jones, 4, **101**: 62; 12. (235) Rodebush, 1, **40**: 1204; 18. (236) Roloff, 7, **18**: 572; 95. (237) Roloff, 7, **18**: 583; 95. (238) Rosenheim and Bertheim, 93, **34**: 427; 03. (239) Rosenheim and Müller, 93, **39**: 175; 04.
(240) Ross and Jones, 1, **47**: 2165; 25. (241) Roth, 7, **43**: 539; 03. (242) Roth, 7, **79**: 599; 12. (243) Roth, B3: 1436. (244) Roth and Knothe, B3: 1443. (245) Roth and Luy, B3: 1442. (246) Roth and Salzmann, B3: 1437, 1439. (247) Roth and Siebler, B3: 1445. (248) Rothmund and Drucker, 7, **46**: 827; 03. (249) Rozsa, 9, **17**: 934; 11.
(250) Rüdorff, 8, **116**: 55; 62. (251) Rüdorff, 8, **145**: 599; 72. (252) Rupert, 1, **32**: 748; 10. (253) Sabancev, 93, **17**: 480; 98. (254) Sanfourche and Liebaut, 27, **31**: 966; 22. (255) Scatchard and Kimball, Mass. Inst. Tech., Cambridge, Mass., 0. (256) Schäfer, 93, **45**: 293; 05. (257) Schreinemakers, 7, **12**: 73; 93. (258) Schroeder, 233, **47**: 600; 10. (259) Schryver, 5, **83**: 96; 10.
(260) Senderens, 34, **170**: 47; 20. (261) Shaw, 324, **9**: 141; 25. (262) Sherrill, 7, **43**: 705; 03. (263) Sluiter, 64V, **23**: 920; 14. 176, **12**: 178; 15. (264) Smits and Postma, 64P, **17**: 187; 14. 64V, **23**: 110; 14. (265) Smits and Postma, 70, **39**: 516; 20. (266) Sommer and Weise, 93, **94**: 51; 16. (267) Stanbridge, 4, **113**: 808; 18. (268) Steele and Johnson, 4, **85**: 113; 04. (269) Tammann, 7, **6**: 122; 90.
(270) Taylor, 7, **27**: 361; 98. (271) Trautz and Anschütz, 7, **56**: 236; 06. (272) Treadwell and Girsewald, 93, **38**: 92; 04. (273) Turner and English, 4, **105**: 1786; 14. (274) Vandenberghe, 93, **10**: 47; 95. (275) Van Name and Brown, 12, **44**: 453; 17. (276) Vasilev, 53, **42**: 423; 10. (277) Vasilev, 53, **42**: 570; 10. (278) Voerman, 176, **2**: 766; 05. (279) Walden and Centnerszwer, 7, **42**: 432; 03.
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EFFECT OF PRESSURE UPON TRANSITION TEMPERATURES OF CRYSTALLINE HYDRATES, UPON FREEZING POINTS, AND UPON SOLUBILITIES

A. L. Th. Moesveld

EFFECT OF PRESSURE UPON THE TRANSITION TEMPERATURES OF CRYSTALLINE HYDRATES

P, atm.	Na_2SO_4*		$ZnSO_4$†		$SrCl_2$‡		Na_2CrO_4§	
0	10 *aq.* ⇌ 0 *aq.* + H_2O	32.73°C	7 *aq.* ⇌ 6 *aq.* + H_2O	38.8°C	6 *aq.* ⇌ 2 *aq.* + H_2O	62.3°C	10 *aq.* ⇌ 6 *aq.* + H_2O	19.6°C
250		32.80		39.5		63.5		18.7
500		32.80		40.2		64.6		17.8
750		32.72		40.8		65.8		16.6
1000		32.57		41.5		66.9		15.3
1250		32.35		42.2		68.1		13.8
1500		32.06		42.8		69.3		12.3
2000		31.25				71.6		8.6
2500		30.16				73.9		+4.3
3000								−0.5
Lit.	(1, 6, 7)		(2)		(6)		(6)	

Interpolation equations

$Na_2SO_4 \cdot 10\ aq.$: t, °C $= 32.73 + 0.423 \times 10^{-3}P - 0.581 \times 10^{-6}P^2 \pm 0.2$

$ZnSO_4 \cdot 7\ aq.$: t, °C $= 38.8 + 2.7 \times 10^{-3}P \pm 0.3$

$SrCl_2 \cdot 6\ aq.$: t, °C $= 62.3 + 4.65 \times 10^{-3}P \pm 0.5$

$Na_2CrO_4 \cdot 10\ aq.$: t, °C $= 19.6 - 0.31 \times 10^{-3}P - 1.2 \times 10^{-6}P^2 \pm 0.$

For qualitative values on other hydrates, *v.* (3).

* Extrapolated value for 1 atm. differs slightly from that of Richards and Wells (4).
† Two indirect methods with relatively large error.
‡ Value for 1 atm. not in good agreement with that of Richards and Yngve (5).
§ Equilibrium P rather uncertain

LITERATURE

(For a key to the periodicals see end of volume)

(1) Block, 7, **82**: 403; 13. (2) Cohen, Inouye and Euwen, 7, **75**: 1; 10. (3) Jänecke, 7, **90**: 265; 15. **91**: 676; 16. (4) Richards and Wells, 7, **43**: 465; 03. (5) Richards and Yngve, 1, **40**: 89; 18. (6) Tammann, B57, p. 251. (7) Tammann, *Aggregatzustände*, p. 97. Leipzig, Voss, 1922.

EFFECT OF PRESSURE UPON FREEZING POINTS OF SOLUTIONS

Components		Lit.
$Ca(NO_3)_2 \cdot 4\ aq.$	$Cd(NO_3)_2 \cdot 4\ aq.$	(1)
Na	Hg	(7, 9)
Benzene	Naphthalene	(2)
Benzene	Benzophenone	(2)
Benzene	Camphor	(2)
Benzene	Urethane	(5)
Diphenylamine	*p*-Nitroanisole	(12)
Naphthalene	Diphenylamine	(10)
Naphthalene	Camphor	(2)
Naphthalene	*p*-Toluidine	(3, 4)
Naphthalene	Urethane	(3, 4)
Naphthalene	*m*-Dinitrobenzene	(11)
Urethane	Monobromocamphor	(3)

Components		Lit.
Urethane	Diphenylamine	(4, 6, 9)
Urethane	*p*-Nitroanisole	(8, 9)
Monochlorocinnamic ald.	Monobromocinnamic aldehyde	(3)
Thymol	*p*-Azoxyanisole	(2)
Thymol	*p*-Azoxyphenetole	(2)
Thymol	*p*-Toluidine	(2)
Phenol	*p*-Toluidine	(2, 12)
m-Chloronitrobenzene	*m*-Bromonitrobenzene	(5)

LITERATURE

(For a key to the periodicals see end of volume)

(1) Hasselblatt, *93*, **119**: 313; 21. (2) Hulett, *7*, **28**: 629; 99. (3) Kultascheff, *195*, **20**: 47; 11. *322*, No. **22**; 15. (4) Kuslasev, *Thesis*, Dorpat, 1915. *10*, **4**: 169; 21. (5) Pushin, *7*, **118**: 447; 25. **119**: 400; 26. (6) Pushin and Grebenshchikov, *53*, **44**: 112; 12. *169*, **16**: 439; 12. *10*, **3**: 64; 14. (7) Pushin and Grebenshchikov, *53*, **44**: 244; 12. *169*, **17**: 201; 12. *10*, **3**: 64; 14. (8) Pushin and Grebenshchikov, *53*, **44**: 1728; 12. (9) Pushin and Grebenshchikov, *7*, **118**: 276; 25.
(10) Roloff, *7*, **17**: 325; 95. (11) Pushin, *7*, **124**: 16; 26. (12) Pushin, *7*, **124**: 217; 26.

EFFECT OF PRESSURE UPON SOLUBILITY

% S = g of solute per 100 g solution
% S' = g of solute per 100 g solvent

$100x$ = mole % of solute
% S or $100x$ = (a + b $\times 10^{-3}P$ + c $\times 10^{-6}P^2$) ± n units

System	P, atm.	0	250	500	750	1000	1250	1500	b	c	n	Lit.
NaCl in H_2O, 25.0°C.	% S	26.42	26.59	26.74	26.88	27.01	27.11	27.20	0.710	−0.126	0.04	(1, 5, 11,
	% S'	35.91	36.22	36.50	36.76	36.99	37.18	37.37	1.287	−0.211	0.06	12, 13, 14,
	$100x$	9.97	10.05	10.12	10.18	10.24	10.29	10.33	0.318	−0.052	0.02	15, 16)
Tl_2SO_4 in H_2O, 30.00°C. . .	% S	5.80	6.64	7.45	8.25	9.02	9.78	10.51	3.38	−0.160	0.03	(3, 6, 10)
	% S'	6.16	7.11	8.05	8.99	9.93	10.84	11.76	3.82	−0.0598	0.04	
	$100x$	0.2066	0.2357	0.2651	0.2932	0.3211	0.3477	0.3741	0.120	−0.00563	0.001	
$ZnSO_4$ in H_2O, 25.0°C. . . .	% S	36.69	36.66	36.62	36.59	36.56			−0.13		0.04	(9, 11, 13)
	% S'	57.95	57.87	57.80	57.72	57.65			−0.30		0.08	
	$100x$	6.073	6.066	6.058	6.051	6.043			−0.03		0.01	
$CdSO_4$ in H_2O, 25.0°C. . . .	% S	43.44	43.65	43.82	43.97	44.08			0.888	−0.24	0.05	(9)
	% S'	76.80	77.46	78.02	78.48	78.84			2.85	−0.8	0.10	
	$100x$	6.23	6.27	6.31	6.35	6.39			0.16		0.01	
$C_6H_{14}O_6$ (mannitol) in H_2O, 24.0°C.	% S	17.11	17.28	17.43	17.55	17.65	17.72	17.77	0.734	−0.195	0.07	(5)
	% S'	20.64	20.87	21.06	21.23	21.37	21.49	21.59	0.945	−0.210	0.08	
	$100x$	2.001	2.024	2.046	2.062	2.076	2.086	2.093	0.102	−0.0273	0.01	
CdHg in Hg (mix. crys.), 25.00°C.	% S	5.59	5.45	5.31	5.17	5.03	4.89	4.75	−0.561		0.01	(2)
	% S'	5.92	5.76	5.61	5.45	5.30	5.14	4.98	−0.624		0.01	
	$100x$	9.56	9.33	9.10	8.87	8.64	8.41	8.18	−0.926		0.02	

System	P, atm.	0	100	200	300	400	500	b	c	n	Lit.
CdI_2 in H_2O, 30°C.	% S	46.79	46.40	46.01	45.62	45.24	44.85	−13		0.1	(4)
	% S'	87.94	86.61	85.28	83.95	82.62	81.29	−38.9		0.2	
	$100x$	4.146	4.086	4.025	3.965	3.904	3.844	− 0.6		0.01	
$Ba(OH)_2$ in H_2O, 25°C.	% S	8.28	8.50	8.72	8.94	9.16	9.38	2.20		0.04	(14)
	% S'	9.03	9.30	9.56	9.83	10.09	10.36	2.56		0.05	
	$100x$	0.528	0.543	0.559	0.574	0.590	0.605	0.154		0.003	
m-$C_6H_4(NO_2)_2$ in $CH_3CO_2C_2H_5$, 30°C.	% S	34.44	33.31	32.24	31.23	30.27	28.38	−11.62	3.00	0.01	(8)
	% S'	52.54	49.96	47.59	45.40	43.42	41.63	−26.73	9.82	0.02	
	$100x$	21.590	20.748	19.959	19.222	18.537	17.905	− 8.678	2.61	0.007	

$C_{10}H_8$ in $C_2H_2Cl_4$ at 30.00°C: $\log_{10}$ % S' = (1.73224 − 0.39974 $\times 10^{-3}P$ + 0.08949 $\times 10^{-6}P^2$) ± 0.05. $\log_{10}(100x)$ = (1.61764 − 0.24196 $\times 10^{-3}P$ + 0.03432 $\times 10^{-6}P^2$) ± 0.03 (7). $\log_{10}$ %S = (1.54504 − 0.26840 $\times 10^{-3}P$ + 0.04320 $\times 10^{-6}P^2$) ± 0.02.

P atm.	0	250	500	750	1000
% S.	35.08	30.24	26.40	23.34	20.89
% S'.	53.98	43.44	35.87	30.39	26.42
$100x$.	41.46	36.25	32.01	28.54	25.71

LITERATURE REFERENCES TO DATA ON OTHER SALTS

In H_2O: NH_4Cl (1, 12, 13, 15, 16); Na_2SO_4 (11); Na_2CO_3 (13); $KClO_3$ (13); K_2SO_4 (11, 12, 15); KNO_3 (13); $K_3Fe(CN)_6$, $K_4Fe(CN)_6$ (12); $KAl(SO_4)_2$ (16); $CuSO_4$ (12, 15).

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(For a key to the periodicals see end of volume)

(1) Braun, *8*, **30**: 250; 87. *7*, **1**: 258; 87. (2) Casteels, *Thesis*, Neuchatel, 1920. (3) Cohen and van den Boseh, *7*, **114**: 453; 25. *64V*, **31**: 606; 22. (4) Cohen, Hetterschij and Moesveld, *7*, **94**: 210; 20. (5) Cohen, Inouye and Euwen, *7*, **75**: 257; 10. (6) Cohen, Ishikawa and Moesveld, *7*, **105**: 155; 23. (7) Cohen, de Meester and Moesveld, *64V*, **33**: 783; 24. *7*, **114**: 321; 24. (8) Cohen and Moesveld, *64V*, **26**: 134, 864, 1241, 1553; 18. *7*, **93**: 385; 19. (9) Cohen and Sinnige, *7*, **67**: 1, 432, 513; 09. **69**: 102; 09.
(10) Cohen, Voller and Moesveld, *64V*, **31**: 617; 23. *7*, **104**: 323; 23. (11) Favre, *34*, **51**: 827, 1027; 60. (12) Möller, *8*, **117**: 386; 62. (13) Pitschel, *Thesis*, Leipzig, 1916. (14) Sill, *1*, **38**: 2632; 16. (15) Sorby, *5*, **12**: 538; 63. (16) Stackelberg, *7*, **20**; 337; 96.

FREEZING POINT—SOLUBILITY DATA. THREE-COMPONENT SYSTEMS CONTAINING A NON-METALLIC ELEMENTARY SUBSTANCE

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Abbreviations

M	Mole = gram molecular weight.
l_s	Liter of solution at temperature of experiment.
[X]	Concentration of constituent X in the units stated.
→ or ↓	Linear relation over the range so marked.

All temperatures given in °C.

AQUEOUS SYSTEMS

A-B Table, Standard Arrangement; A = H_2O; B = The Elementary Substance

Br_2

C = $HgBr_2$ (18)

		Solid C →			C + B (liq.)
25°	[B], 10^{-3} M/l_s	0	75.3	180	223
	[C], 10^{-3} M/l_s	17.0	18.4	19.5	21.2

C = **KBr**, solid phase KBr; accuracy *ca.* ± 1%; density given (20.5)

32.4°	[B], M/l_s	0 →	1.0	1.5	1.715	28°	9.45	14.2
	[C], M/l_s	4.916	5.039	5.085	5.104		6 20	3.63

I_2

Solid phase = I_2; t = 25° (24)

C	Before Saturation [C], M/l_s	After Saturation [B], 10^{-3} M/l_s	C	Before Saturation [C,] M/l_s	After Saturation [B], 10^{-3} M/l_s
Nil	0	1.10	$NaNO_3$†	1.00	1.02
H_3BO_3	0.30	1.18	KNO_3	1.00	1.05
NaCl*†	1.00	2.26	NH_4NO_3	1.00	1.21
KCl*	1.00	2.63	Na_2SO_4*†	0.25	0.82
NH_4Cl	1.00	2.89	K_2SO_4	0.25	0.94
NaBr	1.00	12.9‡	$(NH_4)_2SO_4$	0.25	0.97
KBr*	1.00	14.9‡	$NH_4C_2H_3O_2$	1.00	1.75
NH_4Br	1.00	15.7	$(NH_4)_2C_2O_4$	0.35	3.88

* Data for other temperatures also given.
† *See* (6) for data at 25 and 30°; also gives data for NaH_2PO_4.
‡ *Cf.* p. 267.

The following tables are arranged in order of the C-constituent in accordance with the standard arrangement (*v.* Vol. III, p. viii).

C = **HX**; solid phase = I_2; accuracy, ±1–2% (28); [C] in M/l_s; [B] in 10^{-3} M/l_s; t = 25.2 ± 0.2°

C = HCl [C]	HCl [B]	HBr [B]	HI [B]	C = HCl [C]	HCl [B]	HBr [B]
0	1.31	1.31	1.31	1.0	2.35	15.8
0.1	1.39	2.55	50.0	1.5	3.14	24.9
0.2	1.46	3.80	104	2.0	4.10	35.0
0.3	1.54	5.04	159	2.5	5.00	45.6
0.4	1.62	6.40	219	3.0	5.90	56.7
0.5	1.71	7.80	292	3.5	6.75	69.1
0.6	1.82	9.25	369	4.0	7.51	82.2
0.8	2.07	12.4				

C = **HNO_3** or **H_2SO_4**; solid phase = I_2; t = 10, 25 and 35° (6)

C = **C_2H_5OH**; solid phase = I_2; t = 15°; accuracy *ca.* ±1–3% (34); *cf. below*

Wt. % C in H_2O	g B/100 g (A + C)	Wt. % C in H_2O	g B/100 g (A + C)	Wt. % C in H_2O	g B/100 g (A + C)
0	0.025	35	0.34	70	4.43
5	0.033	40	0.58	75	5.73
10	0.045	45	0.88	80	7.20
15	0.062	50	1.30	85	9.00
20	0.085	55	1.80	90	11.3
25	0.122	60	2.47	95	14.6
30	0.186	65	3.35	100	19.6

t = 25°; accuracy *ca.* 1% (24); % C = Wt. % C in H_2O; [B] in 10^{-3} M/l_s

% C	0	10	20	30	40	50	60	70	80	90	100
[B]	1.1	1.6	2.7	6.6	20.5	50	107	196	340	549	795

C = **CH_3COOH**; solid phase = I_2; 25° (24)

Wt. % C in H_2O	0	10	20	30	40	50
[B], 10^{-3} M/l_s	1.10	1.65	2.50	3.45	5.75	9.65
Wt. % C in H_2O		60	70	80	90	100
[B], 10^{-3} M/l_s		16.0	25.2	42.2	70.2	102.5

C = **$C_3H_5(OH)_3$** Glycerol; solid phase = I_2; 25° (17); *v. further* p. 398

Wt. % C in H_2O	[B], 10^{-3} M/l_s	Wt. % C in H_2O	[B], 10^{-3} M/l_s	Wt. % C in H_2O	[B], 10^{-3} M/l_s
0	1.2	40	3.4	80	19.4
10	1.6	50	5.1	90	31.3
20	2.0	60	7.7	100	48.5
30	2.4	70	11.9	Density given	

C = **C_2H_5OH** Ethyl alcohol or **C_3H_7OH** *n*-Propyl alcohol; t = 14.5 – 15.1°; [C] = Vol % C in A + C; [B] = 10^{-3}M/l_s; solid phase = I_2 (5).

[C]	EtOH [B] ± 1–2%	PrOH [B] ± 1–2%	[C]	EtOH [B] ± 1–2%	PrOH [B] ± 1–2%
10		1.9	60	45	107
20	2	4.2	70	91	161
30	4	15.6	80	167	236
40	10	37	90	294	360
50	22	64	100	617	588

C = **$(C_2H_5)_2O$** Ethyl ether; solid phase = I_2; t = *ca.* 16.6° (36); [X] in M/l_s; up to [A] = 0.440, [B] = 0.2675 [A] + 0.812, and at [A] = 0.471, [B] = 0.990.

C = **PbI_2**; 20° (11.5). A solution saturated with both B and C has [C] = 2.16 × 10^{-3} M/l_s.

C = **$HgCl_2$**; solid phase = I_2; 25°; accuracy *ca.* ±1% (18); [X] in 10^{-3}M/l_s.

[C]	0	50	100	150	200	250	300	334.6
[B]	1.34	9.0	13.2	16.0	18.2	20.5	23.4	25.43

I_2.—(*Continued*)

C = **CuI** ($2\,CuI + I_2 \rightleftarrows 2\,CuI_2$); 20 ± 0.3°; [X] in 10^{-3} M/l_s [11]

$[I_2]$	[Cu]	$[I_2]$	[Cu]
Solid: CuI		Solids: I_2 + CuI	
2	4.00	29.94	19.37
4	6.51	Solid: I_2	
6	8.21	$[I_2] = 1.15 + 1.482$ [Cu] up to [Cu] = 19.4	
8	9.50		
10	10.61	Accuracy 0.2–0.4%	
15	12.99		
20	15.15		
25	17.27		

Solid I_2 + solid CuI at various temperatures

°C	$[I_2]$	[Cu]	Lit.
0	21.53	14.54	[11]
20 ± 0.3	29.94	19.37	[11]
25	32.22	20.70	[3]
40	44.80	26.07	[11]

C = **BaI_2**; 25°; solid phase = I_2; [X] in M/1000 g H_2O; accuracy ±0.2–1% [31]

$[BaI_2]$	$[I_2]$	$[BaI_2]$	$[I_2]$	$[BaI_2]$	$[I_2]$
0.0	0.00133	0.2	0.210	0.8	1.29
0.05*	0.0506	0.4	0.470	1.0	1.78
0.1	0.102	0.6	0.845	1.192	2.288

* For values <0.05, *v.* [31].

C = **NaI**; solid phase = I_2; [X] in M/l_s [15]. At 25° and up to [NaI] = 1.44, $[I_2] = 0.0013 + 0.588$ [NaI], ±0.2–0.5%; d_s = density of the saturated solution at 25°/4° up to [NaI] = 1.0, $d_s = 0.999 + 0.202$ [NaI], ±0.03–0.1%; at [NaI] = 1.44, $d_s = 1.2959$. $y^{t°}$ = grams I_2 dissolved by 100 g NaI solution containing x % NaI at t°; at 25° and up to $x = 20$, $y = 0.993x + 0.033$, ±0.1–0.2%; between $t = 15°$ and $t = 60°$, when $x = 10$, $y = y_o + 0.0705(t-t_o)$, ±0.2–0.5%; between $t = 20°$ and $t = 60°$, when $x = 20$, $y = y_o + 0.142(t-t_o)$, ±0.4–1%.

C = **NaBr**; 25°; [X] in M/l_s; accuracy 0.3–1% [2]

[NaBr]	$[I_2]$	[NaBr]	$[I_2]$
Solid: I_2		Solid: I_2	
0	0.00133	5.0	0.0324
0.5	0.0082	6.0	0.0313
1.0	0.0138	7.0	0.0287
2.0	0.0225	Solids: I_2 + NaBr	
3.0	0.0284		
4.0	0.0315	7.35	0.0275

C = **KBr**; 25°; [X] in M/l_s; accuracy 0.3–1% [2]

[KBr]	$[I_2]$	[KBr]	$[I_2]$
Solid: I_2		Solid: I_2	
0	0.00133	3.0	0.0381
0.5	0.0086	3.5	0.0432
1.0	0.0152	4.0	0.0480
1.5	0.0214	Solids: I_2 + KBr	
2.0	0.0273		
2.5	0.0328	4.77	0.0547

C = **KI**; solubility of I_2 in dilute KI solutions; [X] in 10^{-3} M/l_s: at 0° and up to [KI] = 50, $[I_2] = 0.638 + 0.472$ [KI], and for [KI] = 100, $[I_2] = 48.33$; accuracy ±0.2%; d_4^0 also given [19]; at 25° and up to [KI] = 50, $[I_2] = 1.33 + 0.495$ [KI], and for [KI] = 100, $[I_2] = 51.6$; accuracy ±0.5–1% [3, 27]. Solubility of KI in I_2 solutions; [X] in M/l_s: at 25° and up to $[I_2] = 5.0$, [KI] = 6.27–0.105 $[I_2]$; also $d_4^{25} = 1.728 + 0.180\,[I_2]$ [30].

C = KI.—(*Continued*)

Solubility of I_2 and of KI; [X] in M/l_s; 25°; *see* Fig. 1

[KI]	$[I_2]$	Lit. and remarks
Solid: I_2		
0.0	0.00133	[3]
0.1	0.0516	[27]
0.2	0.106	±0.5–1% [22]
0.3	0.164	
0.4	0.226	
0.5	0.295	
0.6	0.368	
0.7	0.445	±1–3% [22, 30]
0.8	0.524	
0.9	0.610	
1.0	0.700	
1.5	1.22	±0.5–1% [30]
2.0	1.83	
3.0	3.69	
4.0	6.21	
5.0	8.60	

[KI]	$[I_2]$	Lit. and remarks
Solids: I_2+KI		
5.18	8.87	±0.5–1%
Solid: KI		
6.27	0.0	±0.5–1% [30]
6.16	1.0	
6.06	2.0	
5.96	3.0	
5.85	4.0	
5.75	5.0	
5.76	7.97	
5.44	8.47	

For effect of additions of C_2H_5OH, *v.* [29]. For reported existence of solid periodides, *v.* [1, 14].

Temperature coefficient of solubility of I_2; [X] in M/l_s

	[KI]	a
$[I_2]_t = [I_2]_o + a \times 10^{-3}\,(t-t_o)$; range, 10 to 45°; accuracy ±1–2% [12]	0.10	0.265
	0.333	1.03
	0.50	1.27

C = **KN_3**, 30°; [X] in M/l_s; accuracy *ca.* ±1% [4]

$[KN_3]$*	$[I_2]$	$[KN_3]$*	$[I_2]$
Solid: I_2		Solid: I_2	
0.0	0.00179	3.0	0.0653
0.2	0.00543	4.0	0.0886
0.4	0.00930	5.0	0.109
0.6	0.0133	Solids: I_2 + KN_3	
0.8	0.0174	5.53	0.1197
1.0	0.0216		
2.0	0.0430		

* Before saturation with I_2.

C = **RbI**; 25°; equilibrium possibly not completely established; nature of solid phases not determined with certainty [14]

Solid	RbI	RbI + RbI_3	RbI_3		RbI_3 + I_2
% I_2........	0	5.90	8.02	38.08	65.02
% RbI......	61.93	59.94	57.24	33.89	27.92

C = **CsI**; composition of solid phases uncertain [13, 14]

Composition of the single liquid phase

°C	% CsI	% I_2	°C	% CsI	% I_2
	CsI + ice			CsI_3 + CsI_5 + ice	
−4.0	27.69	0	−0.4	3.18	0.32
	CsI + CsI_3 + ice			CsI_5 + I_2 + ice	
(−4.0)	27.52	0.09	−0.2	0.85	0.34
	CsI			CsI_3 + CsI_5	
35.6	51.48	0	25.0	7.71	1.19
	CsI + CsI_3		35.6	10.73	1.81
35.6	51.67	0.71	52.2	16.79	4.52
	CsI_5 + I_2		72.6	26.98	15.08
25.0	2.38	1.24			
35.6	3.74	1.60			

C = CsI.—(*Continued*)
Compositions of the two liquid phases

	L_1		L_2	
°C	% CsI	% I_2	% CsI	% I_2
	$CsI_5 + I_2 + L_1 + L_2$			
51.5	Compositions not determined			
	$CsI_5 + L_1 + L_2$			
52.2	6.72	3.33	22.94	73.72
72.6	16.67	10.51	27.58	68.41
	$I_2 + L_1 + L_2$			
52.2	6.65	3.45	22.80	74.63
72.6	6.27	4.08	17.68	80.02

S

C = $(CH_3)_2CO$; 25°; solubility of "sulfur" in mixtures of acetone and water containing % C of acetone; [S] in 10^{-3} g-atoms/l_s (17)

Wt. % C	85	90	95	100
[S]	7.80	10.12	13.80	20.26

d_4^{25} of solutions also given.

C = Na_2S; 25°; accuracy 0.1–0.2%; solid S, prepared by crystallization from CS_2; [X] in M/(l of A + C) (21)

[Na_2S]	[S]	[Na_2S]	[S]	[Na_2S]	[S]
0.005	0.0185	0.05	0.2115	0.5	1.923
0.01	0.0407	0.1	0.4145	1.0	3.666
0.02	0.0839	0.2	0.8080	2.0	6.950
0.03	0.1273	0.3	1.182		

Temperature coefficient of solubility

[Na_2S] =	t, °C	0	17	25	50
0.5	[S]	1.9198	1.9186	1.9180	1.9125

C = K_2S (35)

NON-AQUEOUS SYSTEMS

$Cl_2 + SO_2 + SO_2Cl_2$; A = Cl_2, B = SO_2, C = SO_2Cl_2 (16)

Solid phase	A + B	B + C	A + C	A + B + C
t, °C	−102.4±0.1	−84.5±0.1	−109.1±0.1	−111.6±0.2
% B	3	71.5	0	8
% C	0	28.5	22.7	16

Also first and second temperature arrests for 4 ternary solutions.

$Br_2 + C_6H_5NO_2 + KBr$; 28.5°; solid phase = KBr; [X] in M/l_s; accuracy ±1–2% (20)

[Br_2]	[KBr]	[Br_2]	[KBr]	[Br_2]	[KBr]
0.1	0.051	0.6	0.225	1.2	0.407
0.2	0.088	0.8	0.288	1.4	0.460
0.4	0.159	1.0	0.350	1.535	0.494

I_2 + Two Organic Compounds. System: $I_2 + CHCl_3 + (C_2H_5)_2O$; 25°; solid phase = I_2; solvent: ether + chloroform; accuracy ±0.2–0.5% (25).

[$(C_2H_5)_2O$] Wt. % in solvent	[I_2] M/1000 g solvent	[$(C_2H_5)_2O$] Wt. % in solvent	[I_2] M/1000 g solvent
0	0.122	60	0.642
10	0.170	70	0.796
20	0.226	80	0.970
30	0.296	90	1.166
40	0.387	100	1.383
50	0.500		

Systems: I_2 + various organic liquids; t = *ca.* 16.6°; solid phase = I_2; [X] in M/l_s (36)

B	A	[A]	[I_2]
CS_2	$CHCl_3$	0	0.703
		0.419	0.804

Systems: I_2 + various organic liquids; t = *ca.* 16.6°; solid phase = I_2; [X] in M/l_s (36).—(*Continued*)

B	A	[A]	[I_2]
CS_2	C_2H_5OH	0.456	0.7965
		0.911	0.855
	$(C_2H_5)_2O$	Up to [A] = 0.609, [I_2] = 0.7029 + 0.1438 [A]	
$(C_2H_5)_2O$	C_6H_6	0	0.812
		1.029	0.804
	$CHCl_3$	0.399	0.769
	C_2H_5OH	Up to [A] = 0.638, [I_2] = 0.812 + 0.2310 [A] and when [A] = 0.851, [I_2] = 1.0015	
	CH_3I	0.548	0.867

t = 14.5–15.1°; solid I_2; solvent = A + B; [X] in M/l_s; accuracy ±1–2% (5)

Vol % B/(A + B) solvent	A = $CHCl_3$				A = CCl_4	
	B = C_6H_6	CS_2	C_2H_5OH	n-C_3H_7OH	C_6H_6	CS_2
	[I_2]	[I_2]	[I_2]	[I_2]	[I_2]	[I_2]
0	0.143	0.143	0.143	0.143	0.081	0.081
10	0.160	0.170	0.171	0.182	0.105	0.102
20	0.176	0.208	0.199	0.218	0.134	0.133
30	0.192	0.253	0.227	0.250	0.161	0.177
40	0.212	0.304	0.246	0.279	0.193	0.218
50	0.239	0.358	0.261	0.308	0.226	0.272
60	0.271	0.420	0.279	0.318	0.261	0.337
70	0.307	0.483	0.307	0.355	0.296	0.407
80	0.346	0.551	0.340	0.436	0.333	0.486
90	0.380	0.622	0.373	0.520	0.372	0.569
100	0.411	0.693	0.617	0.588	0.411	0.693

I_2 + One Organic Compound + a Halide; t = 16–17°; I_2 + KI; [X] in M/l_s; accuracy *ca.* ±1% (7)

Solvent	Solid: I_2		Solid: KI	
	[KI]	[I_2]	[I_2]	[KI]
Ethyl acetate	0	0.555	0	0.077
	0.81	3.16	0.386	0.396
Ethyl alcohol	0	0.882	0	0.087
	0.66	2.47	0.38	0.413
Ethyl bromide	0	0.831	0	0
	0.46	2.44	0.394	0.113
Ethyl cyanide	0	0.433	0	0.024
	0.645	2.52	0.372	0.392
Isobutyl alcohol	0	0.307	0	0
	0.353	1.22	0.379	0.317
o-Nitroanisole	0		0	
	0.360	1.40	0.301	0.302
Nitropentane	0		0	
	1.06	3.72	0.796	0.583
Trichloronitromethane			0	
			0.26	0.04

Solubility of halides in I_2 dissolved in organic nitro-compounds; t = 16–17°; [X] in M/l_s; accuracy ±0.5–2%; composition of solid phases uncertain (7, 8, 9)

Nitromethane		o-Nitrotoluene		m-Nitrotoluene	Nitrobenzene			
[I_2]	[KI]	[KI]	[CsI]	[KI]	[KBr]	[NaI]	[RbI]	[KI]
0	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
0.2	0.212	0.185	0.189	0.180	0.095	0.192	0.195	0.200
0.4	0.413	0.338	0.348	0.330	0.162	0.345	0.367	0.365
0.6	0.607	0.467	0.484	0.452	0.226	0.472	0.515	0.515
0.8	0.800	0.581		0.558	0.289	0.582	0.655	0.650
1.0	0.983	0.680		0.653	0.346	0.672	0.778	0.756

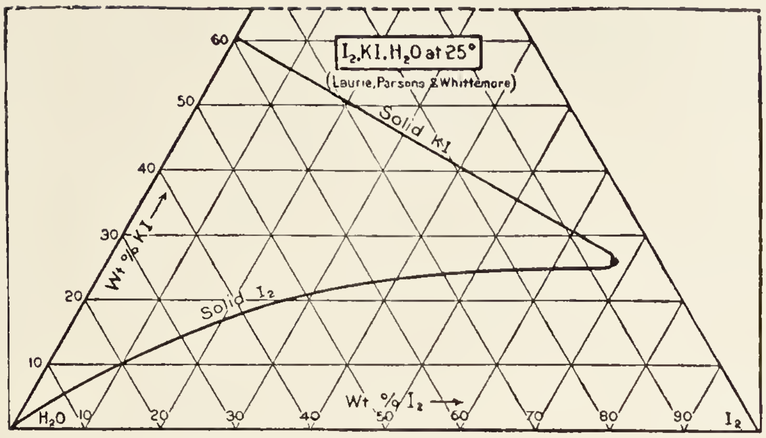
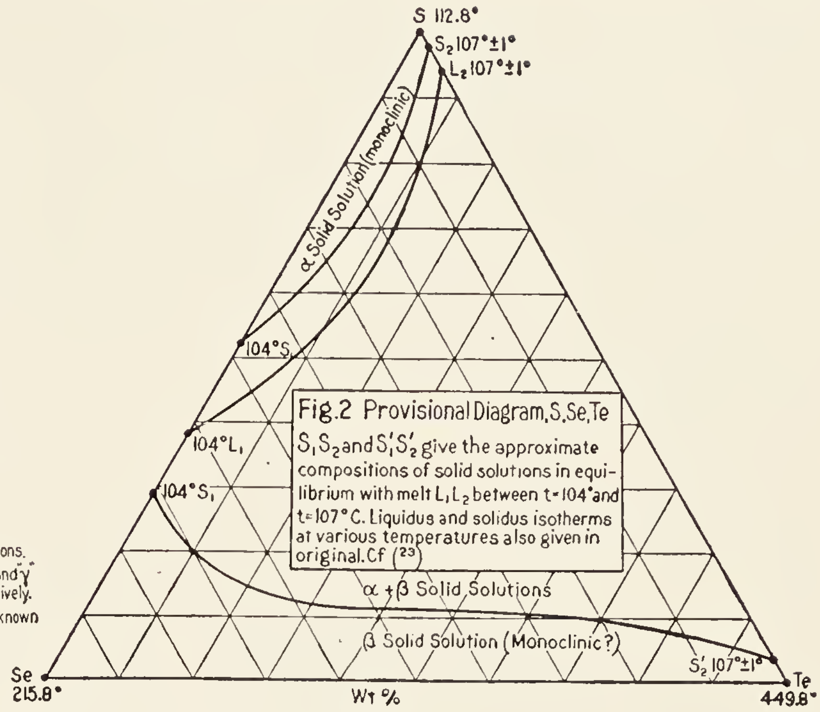
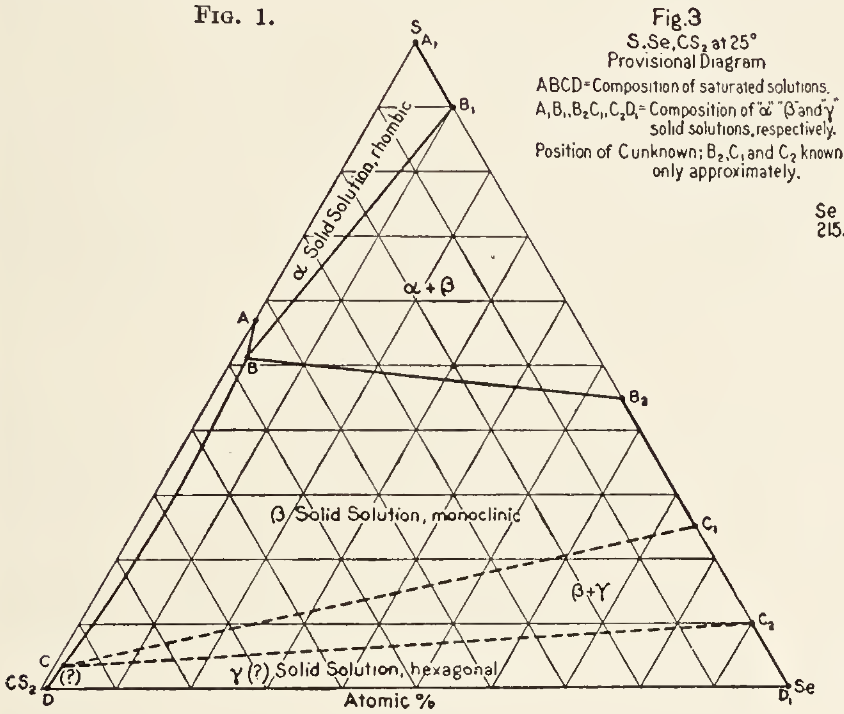
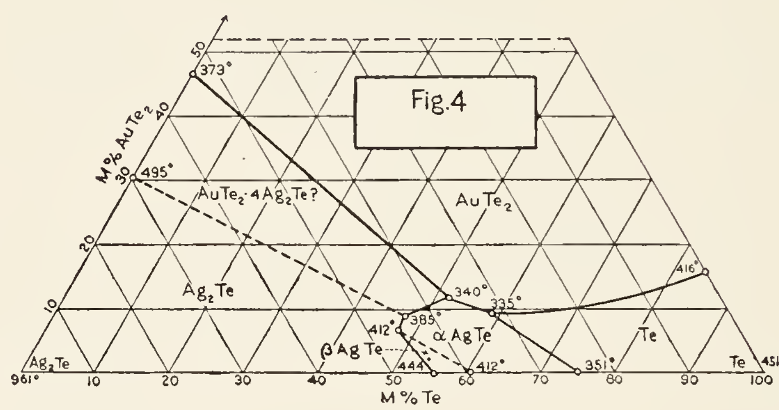


FIG. 1.







Solubility of halides in I_2 dissolved in organic nitro-compounds; t = 16–17°; [X] in M/l$_s$; accuracy ± 0.5–2%; composition of solid phases uncertain (7, 8, 9).—(*Continued*)

Nitromethane		*o*-Nitrotoluene		*m*-Nitrotoluene	Nitrobenzene			
[I_2]	[KI]	[KI]	[CsI]	[KI]	[KBr]	[NaI]	[RbI]	[KI]
1.5	1.39	0.887	For CsI +	0.861	0.484	0.875	1.04	0.960
2.0		1.06	CsI_3? †,	1.04	0.605	1.05	1.25	1.14
2.5		1.21	[I_2] =			1.21		
3.0		1.34	0.617			1.34		
3.5			and [CsI]			1.43		
2.52*			= 0.494		0.71			

* Saturated. † Solid phases.

Nitrobenzene

[I_2]	[LiI]*	[BaI_2]	[$(CH_4)_4$-NI]	[SrI_2]	[KCl]	[RbCl]	[CsCl]
0	0.380	(0)	(0)	(0)	(0)	(0)	(0)
0.2	0.620	0.07$_1$	0.202	0.08$_7$	0.030	0.044	0.080
0.4	0.836	0.13$_5$	0.394	0.17$_0$			
0.6	1.05	0.19$_3$	0.570				
0.8	1.25	0.24$_8$					

AgI and CdI_2 insoluble.

* Solid phase probably $LiI.C_6H_5NO_2$.

Solubility of I_2 in halides dissolved in organic nitro-compounds; t = 16–17°; [X] in M/l$_s$; accuracy ±0.5–2% (7, 8, 9)

Nitromethane		*o*-Nitrotoluene		*m*-Nitrotoluene		Nitrobenzene		
Hal. =	KI	KI	CsI	KI	NaI	KI	KBr	LiI
[Hal.]	[I_2]	[I_2]	[I_2]	[I_2]	[I_2]	[I_2]	[I_2]	[I_2]
0					0.200	0.200	0.200	0.200
0.1			0.5$_1$		0.523	0.541	0.530	0.5$_3$
0.2			0.9$_1$		0.852	0.893	0.858	0.8$_7$
0.3		1.22	1.2$_6$	1.2$_4$	1.21	1.25	1.18	1.2$_3$
0.4		1.59	1.64	1.6$_4$	1.58	1.62	1.51	1.6$_0$
0.5	1.28	1.96	2.00	2.0$_3$	1.97	1.99	1.84	1.9$_9$
0.6	1.56	2.33	2.38	2.4$_2$	2.36	2.37	2.16	2.4$_0$
0.7	1.84	2.71	2.77	2.8$_2$	2.76	2.75	2.49*	2.8$_1$
0.8	2.14	3.10	3.15	3.2$_2$	3.16	3.15		
0.9	2.45	3.50	NH_4I		3.58	3.55		
1.0	2.77				3.95			
1.2	3.45				4.50			
0.65			2.64					

* For [KBr] = 0.71 (satd.), [I_2] = 2.52.

Solubility of I_2 in halides dissolved in organic nitro-compounds; t = 16–17°; [X] in M/l_8; accuracy ±0.5–2% (7, 8, 9).—(*Cont'd*)

Nitrobenzene

Hal. =	RbI	C_6H_5-NH_3I	C_6H_5N-$(CH_3)_2HI$	NH_4I	BaI_2	$(CH_3)_4NI$	SrI_2
[Hal.]	[I_2]	[I_2]	[I_2]	[I_2]	[I_2]	[I_2]	[I_2]
0.1	0.55	0.51	0.52	0.51	0.85	0.53	0.82
0.2	0.91	0.85	0.85	0.86	1.55	0.89	1.52
0.3	1.28	1.20	1.20	1.21	2.30	1.24	2.28
0.4	1.65	1.55	1.56	1.59	3.14		
0.5	2.03	1.91	1.93	1.98			
0.6	2.41	2.29	2.31				
0.7	2.82	2.68	2.69				
0.8	3.22	3.07					
0.9	3.64						
1.0	4.08						

Iodides of alkali metals and ammonium in equilibrium with iodine dissolved in benzene; [I_2] in M/l_8; 25°; accuracy *ca.* ±1% (1)

Solid phases	[I_2]	Solid phases	[I_2]
I_2	0.548	$RbI_3 + RbI_7$(?)	0.348
$LiI + I_2$	0.548	$RbI_7 + RbI_9$(?)	0.401
$NaI + I_2$	0.548	$CsI + CsI_3$	0.00169
$KI + KI_7$(?)	0.333	($CsI_3 + CsI_5$ or CsI_7)(?)	0.0850
$NH_4I + NH_4I_3$(?)	0.0285	$CsI_3 + CsI_9$(?)	0.282
$RbI + RbI_3$(?)	0.0133		

Relative freezing-point lowering (R) of I_2 and iodides in nitrobenzene; iodide = 0.1M/l_8; "Comp." = "empirical composition of total solute" (10)

Iodide	I_2, M/l_8	"Comp."	R
Nil	0.1	I_2	1.00
KI	0.1	KI_3	1.83
KI	0.2	KI_5	1.90
KI	0.3	KI_7	2.25
KI	0.4	KI_9	2.72
NH_4I	0.2	NH_4I_5	1.83
$(CH_3)_4NI$	0.2	$(CH_3)_4NI_5$	1.89
$(C_3H_7)_4NI$	0	$(C_3H_7)_4NI$	1.35
$(C_3H_7)_4NI$	0.1	$(C_3H_7)_4NI_3$	1.68
$(C_3H_7)_4NI$	0.2	$(C_3H_7)_4NI_5$	1.78

I_2 + S + CS_2; accuracy *ca.* ± 1%; densities also given (26)

10°C				18°C			
% S	% I_2	% S	% I_2	% S	% I_2	% S	% I_2
Solid: I_2*		Solid: S		Solid: I_2*		Solid: S	
0	10.74	23.55	0	0	13.54	28.70	0
5	11.33	24.13	2	5	14.18	29.40	2
10	11.92	24.57	4	10	14.83	30.02	4
15	12.50	25.23	6	15	15.47	30.69	6
20	13.09	25.84	8	20	16.11	31.34	8
25	13.66	26.30	10	25	16.76	31.97	10
Solids: I_2 + S		26.81	12	30	17.40	32.54	12
27.33	13.93			Solids: I_2 + S		33.10	14
				34.16	17.93	33.60	16

* At 10°, % I_2 = 10.74 + 0.1175 (% S). At 18°, % I_2 = 13.54 + 0.1286 (% S), (±0.3 to 1 %).

S + Se + Te (23); *see* Fig. 2; two solid solutions; α, monoclinic; β, monoclinic?

t, °C	Mole %, liq.			Mole %, α			Mole %, β		
	S	Se	Te	S	Se	Te	S	Se	Te
104	60	40	0	73	27	0	50	50	0
106	98.4	0	1.6	99.5	0	0.5	9	0	91

S + Se + CS_2 (33); *see* Fig. 3; accuracy very uncertain; equilibrium apparently not completely established in all experiments.

Te + Ag_2Te + $AuTe_2$(32); *see* Fig. 4

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FREEZING-POINT—SOLUBILITY DATA FOR THREE- (OR MORE) COMPONENT AQUEOUS SOLUTIONS OF SALTS AND INORGANIC COMPOUNDS

W. C. Blasdale

Scope of the Section

This section includes all systems composed of water and two or more components belonging to one or more of the following classes: (*a*) salts; (*b*) strong acids or bases; (*c*) compounds whose key-formulae do not begin with 16, except:

1. Some data involving slightly soluble substances, for which *see* final index.
2. Detailed values along the ice curve, for which *see* p. 254.
3. Data involving two liquid phases, for which *see* Vol. III, p. 386.
4. Systems containing two soaps, *see* final index.

The pressure is atmospheric unless otherwise noted.

Arrangement

The systems are listed in the standard arrangement (*v.* Vol. III, p. viii) in accordance with the principal ions which are present in solution. To find a given system, proceed as follows: Write down

Champ de la Section

Cette section comprend tous les systèmes composés d'eau et de deux constituants ou plus appartenant à l'une ou à plusieurs des classes suivantes: (*a*) sels; (*b*) acides ou bases forts; (*c*) composés dont la formule clé ne commence pas par 16, à l'exception:

1. De quelques données se rapportant à des substances peu solubles; pour celles-ci, *voir* l'index final.

2. Des valeurs détaillées, le long de la courbe de congélation; pour celles-ci, *voir* p. 254.

3. Des données se rapportant à deux phases liquides; pour celles-ci, *voir* Vol. III, p. 386.

4. Des systèmes contenant deux savons; pour ceux-ci, *voir* l'index final.

La pression est la pression atmosphérique à moins d'une autre indication.

the principal ions present (omitting H^+ and OH^-) and arrange them in the standard arrangement. Thus the finding formula for the system, $H_2O + Al_2(SO_4)_3 + KOH$ or the system $H_2O + [Al(OH)_3$ or $Al_2O_3] + K_2SO_4$, would be SO_4^{--}, Al^{+++}, K^+. Using the standard arrangement first locate SO_4^{--}. Under that find Al^{+++}, and under Al^{+++} find K^+.

In the case of amphoteric electrolytes or in other cases where the principal ion species is not obvious, any of the ion species or the full formula of the substance itself may be used in the finding formula for the system and the system will be located with little difficulty.

Abbreviations, Symbols and Conventions; *v.* p. 4

The compositions given in the tables are those of the liquid phase (except where otherwise indicated) when it is in equilibrium with the solid phases which are indicated in the center of the columns.

Diagrams (*v.* p. 382–394) (412)

General.—In all diagrams the compositions of the liquid phase, or of mixtures of liquid and solid phases, are represented by crosses. The theoretical compositions of pure solids are represented by small circles labeled with the formula of the solid. The letters A, B, C, D, etc., which appear on the diagrams are used also in the corresponding tables where quantitative data for the points thus designated are given.

Umfang

Dieser Abschnitt enthält alle aus Wasser bestehende Systeme mit noch zwei oder mehr Komponenten, welche zu einer der folgenden Klassen (oder zu deren mehreren) gehören: (*a*) Salze, (*b*) starke Säuren oder Basen, (*c*) Verbindungen deren Schlüsselzahl nicht mit 16 beginnt, ausgenommen:

1. Werte die sehr wenig lösliche Stoffe betreffen, *siehe* Schlüssindex.
2. Genauere Werte längst der Eiskurve, *siehe* S. 254.
3. Werte für zwei flüssige Phasen, *siehe* Bd. III, S. 386.
4. Systeme welche zwei Seifen enthalten, *siehe* Schlussindex.

Druck immer atmosphärischer, wenn nichts anderes angegeben.

Anordnung

Die Systeme sind in der Standardanordnung (Bd. III, S. viii), in Übereinstimmung mit den in der Lösung vorwaltend vorhandenen Jonen, gereiht. Um ein gegebenes System zu finden, gehe man folgendermassen vor: Man schreibe die vorhandenen vorwaltenden Jonen (mit Ausnahme von H^+ und OH^-) nieder und ordne sie nach der Standardanordnung. Für das System, z. B., $H_2O + Al_2(SO_4)_3 + KOH$ oder $H_2O + [Al(OH)_3$ oder $Al_2O_3] + K_2SO_4$, wäre die so niedergeschriebene Formel: SO_4^{--}, Al^{+++}, K^+ auf Grund welcher nun das Nachschlagen zu erfolgen hat. Nach der Standardanordnung hat man zuerst SO_4^{--} festzustellen, unter diesem Al^{+++}, und unter Al^{+++}, K^+.

Im Falle amphoterer Elektrolyte, oder in Fällen wo es nicht klar ist welches Jon als vorwaltend anzusehen ist, benütze man irgend eine Jonenart oder die ganze Formel des Stoffes selbst zum Nachschlagen. Das System kann auch so ohne viel mehr Schwierigkeit festgestellt werden.

Abkürzungen, Zeichen und Festlegungen; *siehe* dafür S. 4

Die in den Tafeln angegebenen Zusammensetzungen betreffen die flüssigen Phasen (ausgenommen dorten wo es anders angegeben ist) im Gleichgewicht mit der in der Mitte der Spalte verzeichneten festen Phase.

Diagramme (S. 382–394) (412)

In allen Diagrammen ist die Zusammensetzung der flüssigen Phase oder der Mischung von flüssigen und festen Phasen durch Kreuze dargestellt. Die theoretische Zusammensetzung der reinen festen Stoffe ist durch kleine Kreise kenntlich gemacht, bei

Arrangement

Les systèmes sont disposés en liste suivant l'arrangement type (*v.* Vol. III, p. viii) en accord avec les principaux ions présents dans la solution. Pour trouver un système donné, il faut procéder comme suit: Écrire les principaux ions présents (en omettant H^+ et OH^-) et les disposer suivant l'arrangement type. Ainsi la formule de recherche pour le système, $H_2O + Al_2(SO_4)_3 + KOH$ ou du système $H_2O + [Al(OH)_3$ ou $Al_2O_3] + K_2SO_4$, sera SO_4^{--}, Al^{+++}, K^+. Utilisant l'arrangement type d'abord trouver SO_4^{--}. Sous ce dernier on trouvera Al^{+++}, et sous Al^{+++} on cherchera K^+.

Dans le cas d'électrolytes amphotères ou dans d'autres cas où l'espèce de l'ion principal n'est pas évidente, on peut utiliser pour la formule de recherche du système l'une des espèces de l'ion ou même la formule complète de la substance et le système sera trouvé avec peu de difficulté.

Abréviations, Symboles et Conventions; *voir* p. 4

Les compositions données dans les tables sont celles de la phase liquide (à moins d'une autre indication) lorsqu'elle se trouve en équilibre avec les phases solides qui sont indiquées dans le centre des colonnes.

Diagrammes (*v.* p. 382–394) (412)

Dans tous les diagrammes, les compositions de la phase liquide ou des mélanges des phases liquides et solides sont représentées par des croix. Les compositions théoriques des solides purs sont représentées par de petits cercles comprenant la formule du solide. Les lettres A, B, C, D, etc., inscrites sur les diagrammes se retrouvent dans les tables correspondantes où se trouvent les données quantitative pour les points ainsi désignés.

Sommario

Questo capitolo comprende tutti i sistemi formati da acqua e da due o più componenti appartenenti a una o più delle seguenti classi: (*a*) sali; (*b*) acidi e basi forti; (*c*) composti la cui formula chiave non comincia con 16. Sono eccettuati:

1. Alcuni dati intorno a sostanze poco solubili, per i quali si deve consultare l'indice finale.
2. Valori dettagliati riferentisi alla curva di ghiaccio, per i quali si deve consultare p. 254.
3. Dati riferentisi a due fasi liquide, per i quali si veda a Vol. III, p. 386.
4. Sistemi contenenti due saponi, *vedi* l'indice finale.

La pressione è sempre quella atmosferica quando non siano date altre indicazioni.

Ordine di Disposizione

Seguendo l'ordine di disposizione standard (*v.* Vol. III, p. viii) i sistemi sono elencati basandosi sopra i principali ioni presenti in soluzione. Per trovare un dato sistema si scrivono i principali ioni presenti (omettendo H^+ e OH^-) e si dispongono nell'ordine standard. Così, ad esempio, la formula per il sistema: $H_2O + Al_2(SO_4)_3 + KOH$ oppure per il sistema $H_2O + [Al(OH)_3$ o $Al_2O_3] + K_2SO_4$, sarà SO_4^{--}, Al^{+++}, K^+. Secondo l'ordine standard si mette al primo posto SO_4^{--}, viene poi Al^{+++}, e infine K^+.

Nel caso di elettroliti amfoteri, e altri casi in cui non è evidente quali sono i tipi principali di ioni, si può usare per formula di ricerca una qualunque delle specie di ioni oppure l'intiera formula della sostanza; il sistema sarà in ogni caso rintracciabile senza grave difficoltà.

Abbreviazioni, Simboli e Convenzioni; *vedi* p. 4

Le composizioni riportate nelle tabelle sono quelle della fase liquida (salvo contrarie indicazioni) in equilibrio con i solidi indicati nel centro delle colonne.

Diagrammi (*v.* p. 382–394) (412)

In tutti i diagrammi le composizioni delle fasi liquide o dei miscugli di liquidi e solidi sono indicate con croci. Le composi-

welchen die Formel des festen Stoffes steht. Die Buchstaben A, B, C, D, etc., welche in den Diagrammen vorkommen, werden ebenfalls in den entsprechenden Tabellen gebraucht, in welchen sich die quantitativen Angaben für die Lage der so bezeichneten Punkte vorfinden.

zioni teoriche dei solidi puri sono rappresentate da piccoli circoli, nei quali è scritta la formula del solido. Le lettere A, B, C, D, ecc., che compaiono nei diagrammi sono usate anche nelle tavole corrispondenti dove si trovano riportati dati quantitativi per i punti segnati a questo modo.

Three-Component Systems

In these systems the equilateral triangle has been largely employed. The three apices of the triangle represent 100% and the three opposite edges 0% of each of the three respective components, namely, water and two electrolytes. The broken line connecting the points representing the composition of the two solutions saturated as to the two electrolytes, separates the region representing unsaturated solutions from that representing different proportions of saturated solution and one or more solid phases. Thus the broken line AB-BC-CD-DE-EF of Fig. 43 represents the composition of the solutions in equilibrium with each of the five different solid phases concerned.

Where the nature of the solid phase has been determined by the residue method of Schreinemakers many of the data representing the composition of mixtures of saturated solutions and solids have been given on the diagram, only rarely in numerical form. This method consists in determining the composition of a series of liquid phases, and of mixtures of these liquids and the solid or solids with which they are in equilibrium. When the points representing such a solution and the corresponding mixture are connected, the line must converge toward a point representing the composition of the solid, if the solution is saturated with that solid. Thus the convergence of the lines extending from points on the CD portion of the curve (Fig. 43) indicates that all of these solutions are saturated with a solid having the composition $NH_4Cl.FeCl_3$. The lack of convergence, at least within the limits of the diagram, of the lines extending from points on the AB portion of the curve indicates that the solid here concerned is of variable composition and is made up of mixtures of NH_4Cl and $FeCl_3.2H_2O$.

Certain systems yield more intelligible diagrams when represented by reference to two axes intersecting at 90°, each axis representing the amount of electrolyte, either in grams, equivalents or moles, per constant amount of water or saturated solution. Thus in Fig. 83 the horizontal axis represents the SO_3 and the vertical the NH_4OH in moles per 1000 g of solution. The broken line AB-BCD-DE-EFG represents the composition of solutions in equilibrium with each of the four different solid phases.

A third type of diagram has been used in dealing with systems in which the two electrolytes form one or more series of solid solutions, as in Fig. 48. The percentage by weight of one electrolyte (in the illustration cited, NH_4Cl) in the solid phase is plotted on a horizontal axis, and the percentage of the same electrolyte in the mixture of the solid salts present in the saturated solution (in the illustration, of NH_4Cl and KCl) with which this solid is in equilibrium, on the vertical axis. If the resulting curve is continuous, as in the curve for 90°C, it signifies that the two solids form a continuous series of solid solutions. If it shows discontinuities associated with horizontal portions, as the curve for 25°C, it signifies that at least two different solid solutions are concerned. At this temperature one of the two solids can vary from 0 to 21%, corresponding to the point D, of NH_4Cl and the other from 93%, corresponding to the point E, to 100% of NH_4Cl.

Where sufficient data were available, a temperature-concentration diagram has been used. The composition of the liquid phase at various temperatures is plotted with respect to three axes. The horizontal and vertical axes represent the respective percentages of the two electrolytes in the solution and the third, which is made to assume an angle of 45° with the two others, represents temperature. When the points representing saturation with respect to two different solids are properly connected a series of polythermal lines results which indicate the limits in space of the surfaces representing solutions saturated with respect to the different solids. Thus in Fig. 99 the horizontal axis indicates percentages of $(NH_4)_2SO_4$, the vertical one of Na_2SO_4 and the five surfaces represent solutions of varying composition saturated as to ice, $Na_2SO_4.10H_2O$, $(NH_4)_2SO_4.Na_2SO_4.4H_2O$, $(NH_4)_2SO_4$ and Na_2SO_4. The space included within these surfaces and the vertical and horizontal planes represents unsaturated solutions.

Four-Component Systems

Four-component systems composed of water and three electrolytes which yield a common ion have been represented by reference to three axes which intersect in space at 90° but are shown on a plane surface as though they intersected at 120°. Each axis represents the amount of one of the three electrolytes present in a constant amount of water or of saturated solution. Thus in Fig. 129 the point D on the vertical axis represents the number of equivalents of $MgSO_4$ per 1000 M of water required to saturate the solution with $MgSO_4.7H_2O$. Similarly the point G represents the equivalents of K_2SO_4 required to saturate the solution with K_2SO_4 and A the equivalents of Na_2SO_4 required to saturate with Na_2SO_4. It is obvious that the line D-E-F-G represents the three-component system $MgSO_4 + K_2SO_4 + H_2O$; the line G-H-I-A, the system $K_2SO_4 + Na_2SO_4 + H_2O$ and the line A-B-C-D, the system $Na_2SO_4 + MgSO_4 + H_2O$. The four-component system is limited by the three planes between the three axes, and by a series of surfaces in the space between these planes. In this illustration this surface is composed of six separate surfaces, which are assumed to be planes, intersecting in the points P, Q, R, and S. Each of these surfaces represents the series of solutions of varying composition saturated with respect to some one solid phase, the composition of which is indicated by the labels.

In some systems the composition of the liquid phase is expressed in terms of the number of grams or moles of the three electrolytes in 100 g or M of the mixture of salts, which would be obtained if the liquid phase were evaporated to dryness, and the resulting salts dehydrated. Where this method is employed it is also necessary to state the amount of water needed to dissolve 100 g or M of the mixed salts to define the composition of the liquid phase completely. The proportions of the three salts in the residue which would be obtained by evaporating the liquid phase are conveniently represented by means of the equilateral triangle as in Fig. 59.

Four-component systems composed of water and four different ions, which form a reciprocal salt pair, necessarily include four three-component systems as constituent parts, each of which is treated separately. The liquid phase of the more complex system is conveniently represented graphically by the method of van't Hoff. This necessitates expressing its composition in equivalents (not in weight units) per constant amount of water or of solution. If all four ions are in the solution three different salts are needed to express the composition of any such solution, and four are necessary for all possible solutions, unless negative quantities are employed. The amounts of these four salts are measured from the point of intersection of two axes which make an angle of 90° with each other. Thus in Fig. 85 the point A represents solutions saturated with $Na_2SO_4.10H_2O$, E with $(NH_4)_2SO_4$, G with $(NH_4)HCO_3$ and I with $NaHCO_3$. If the solution contains both Na_2SO_4 and $(NH_4)HCO_3$ or both $(NH_4)_2SO_4$ and $NaHCO_3$ the excess of one salt over the other is measured on the axis to which the excess pertains. The point of intersection may represent either pure

water or solutions which contain any one of an infinite number of equivalent proportions of the two pairs of salts. Solutions containing any one of the four ions as a common ion must be represented by a series of points, which form four different broken lines connecting the points representing saturation as to a single salt. The space included within these lines must represent solutions containing all four ions and saturated with respect to one, two or three different solids. If the points representing saturation as to different pairs of solids are connected the entire space is divided into areas, each area indicating all possible solutions saturated as to each of the solids represented. Thus in Fig. 85 the lines JP, BP, PQ, CQ, QR, RH, RS, SF and SD represent saturation with respect to the two solids whose formulae are printed within the areas which the lines separate. The points P, Q, R and S represent saturation with respect to three different solids.

Five-Component Systems

It is not possible to represent these systems by a graphical method unless certain simplifications are made. In the only system of this degree of complexity for which data are available, namely, the system composed of $MgCl_2 + KCl + NaCl + Na_2SO_4 + H_2O$, it is assumed that the solution is always saturated with NaCl. It then becomes possible to express the composition of the liquid phase by means of three axes representing KCl, $MgCl_2$, and Na_2SO_4, respectively. In order to express the composition in conformity with this scheme it is necessary to assume that $Na_2SO_4 = MgSO_4 + 2NaCl - MgCl_2$, or expressed differently, that all the SO_4 is measured on the Na_2SO_4 axis and all the Mg on the $MgCl_2$ axis. The three axes may be made to intersect at 120° and the composition of the solution expressed in terms of K, ½ Mg, and ½SO_4 as has been done in Figs. 18 to 21, inclusive.

Six-Component Systems

The only one for which data are available is derived from $CaCl_2$, $MgCl_2$, KCl, Na_2SO_4 and H_2O; it results from adding Ca to the five-component system just considered. It is again necessary to assume that NaCl is always present as a solid and to eliminate solutions in equilibrium with chloride-containing calcium salts. Owing to the slight solubility of both single and double sulfates of calcium their presence as solid phases changes but slightly the form and dimensions of Figs. 18 and 19. A fair understanding of the system at 0°C and 25°C is obtained by assuming that the spaces limited by the planes of these figures are subdivided into smaller spaces which correspond to spaces saturated as to some one solid which contains Ca and SO_4. At 0°C the plane A-B-E-D of Fig. 9 separates spaces representing saturation as to $CaSO_4.2H_2O$ and $CaSO_4.K_2SO_4.H_2O$. At 25°C (Fig. 10) there are six planes which separate spaces representing saturation as to $CaSO_4$, $CaSO_4.K_2SO_4.H_2O$, $CaSO_4.Na_2SO_4$ and $MgSO_4.K_2SO_4.2CaSO_4.2H_2O$, respectively.

At 55°C (Fig. 11) addition of the calcium ion changes the form of the entire diagram, since $CaSO_4$ reacts with KCl and it becomes necessary to consider $CaCl_2$ as an important constituent of the liquid phase. The calcium content can be measured on the SO_4 axis but in the opposite direction from that used to represent SO_4. Owing to the limited data it is only possible to outline roughly the limits of the spaces representing solutions containing but little magnesium, which are saturated as to $CaSO_4$, $CaSO_4.Na_2SO_4$, $CaSO_4.K_2SO_4.H_2O$ and $5CaSO_4.K_2SO_4.H_2O$. Above these spaces there is one saturated as to $MgSO_4.K_2SO_4.H_2O$ and probably others saturated as to still other complex calcium-containing sulfates.

At 83°C (Fig. 12) the formation of $CaCl_2$ is still further accentuated and although the solid calcium-containing phases are not changed, the spaces within the diagram to which they correspond are changed profoundly.

H_2O_2 SO_4^{--} K^+
$H_2O + H_2O_2 + K_2SO_4$
t = 20°C (227)

g H_2O_2/l	g K_2SO_4/l
K_2SO_4	
43.8	136.1
44.0	139.9
85.6	167.2
130.7	199.6
162.8	224.8
168.0	232.3
232.1	265.8
247.5	288.3
302.7	341.4
305.4	346.8
726.0	672.2

F^- Cl^- Sb^{+++} K^+
$H_2O + SbF_3 + KCl$
t = 0°C (316)

M_{KCl}/l	g SbF_3/100g H_2O
SbF_3	
0	384.7
0.125	407.3
0.250	431.9
0.500	448.3
1.000	461.8

F^- Br^- Sb^{+++} K^+
$H_2O + SbF_3 + KBr$
t = 0°C (316)

M_{KBr}/l	g SbF_3/100g H_2O
SbF_3	
0	384.7
0.125	417.2
0.250	455.6
0.500	450.0
1.000	448.7

F^- NO_3^- Sb^{+++} K^+
$H_2O + SbF_3 + KNO_3$
t = 0°C (316)

M_{KNO_3}/l	g SbF_3/100g H_2O
SbF_3	
0	384.7
0.125	401.4
0.250	418.3
0.500	451.9
1.000	458.2

F^- NH_4^+ Sb^{+++} $C_2O_4^{--}$
$H_2O + NH_4F + Sb_2(C_2O_4)_3$
t = 0°C (316)

M ½$(NH_4)_2$-C_2O_4/l	g SbF_3/100g H_2O
SbF_3	
0	384.7
0.125	433.3
0.250	442.3
0.500	431.9

F^- Sb^{+++}
$H_2O + HF + SbF_3$
t = 0°C (316)

M_{HF}/l	g SbF_3/100g H_2O
SbF_3	
0	384.7
0.5	404.0
1.0	432.5
2.0	474.9

F^- Sb^{+++} $C_2O_4^{--}$ K^+
$H_2O + SbF_3 + K_2C_2O_4$
t = 0°C (316)

M ½$K_2C_2O_4$/l	g SbF_3/100g H_2O
SbF_3	
0	384.7
0.125	405.2
0.250	451.3
0.500	481.2
1.000	465.7

F^- Sb^{+++} $C_4H_4O_6^{--}$ K^+
$H_2O + SbF_3 + K_2C_4H_4O_6$
t = 0°C (316)

M ½$K_2C_4H_4O_6$/l	g SbF_3/100g H_2O
SbF_3	
0	384.7
0.125	435.2
0.250	430.8
0.500	430.5
1.000	461.4

F^- Hg^{++}
$H_2O + HF + HgO$
t = 25°C (89)

M_F/l	M_{Hg}/l
HgF_2	
9.60	0.736
8.60	0.6825
7.63	0.6265
5.00	0.440
2.05	0.2022
1.309	0.1385
HgF_2 + HgO	
1.148	0.1227

F^- Pb^{++} Na^+
$H_2O + HF + PbF_2 + NaF$
t = 25°C (74)

% H_2F_2	% Na_2F_2	% PbF_4.-2NaF
PbF_4.2NaF		
38.61	0.368	9.358
40.0	Tr.	10.49
37.23	2.33	5.07

F^- Pb^{++} K^+
$H_2O + HF + PbF_2 + KF$
t = 25°C (74)

% H_2F_2	% K_2F_2	% 3KF.-HF.PbF.
3KF.HF.PbF_4		
29.1	1.71	11.23
30.0	0.0	12.21
20.0	25.0	1.70

$F^- \; Ag^+$ (156): $H_2O + HF + AgF$

t = 0°C		t = 14°C		t = 24°C		t = 32°C	
% HF	% AgF	% HF	% AgF	% HF	% AgF	% HF	% AgF
			$AgF.4H_2O$				
0.40	87.50	0.40	137.0				
3.97	93.80	2.60	145.0				
9.60	118.50	5.80	159.25				
13.75	153.0						
			$AgF.4H_2O + AgF.2H_2O$				
14.0	156.0	6.40	162.0				
			$AgF.2H_2O$				
17.2	159.0	14.50	169.5	0.0	178.00	0.0	193.0
24.0	185.0	17.30	176.0	8.1	178.0		
24.40	186.8	18.50	180.50	10.0	179.50		
		19.35	187.0	13.4	189.50		
			$AgF.2H_2O + AgF(?)$				
				14.30	191.50		
			$AgF.H_2O$				
				13.0	194.50	0.45	216.75
			$AgF.H_2O + AgF$				
				18.80	189.50	4.70	211.75
			AgF				
25.70	189.0	25.40	189.0	36.6	193.0	7.0	205.00
28.0	189.0	27.00	186.0	16.0	193.50	11.0	198.0
29.50	188.0	28.80	188.20			29.0	179.0
38.00	194.0	38.00	196.50			16.40	185.5
39.2	195.8	40.00	197.50			36.60	194.50
			$AgF + AgF.2HF$				
		42.50	201.00				
		56.40	134.50				
			$AgF.2HF$				
54.80	130.3						
56.70	127.6						
57.20	127.75						
66.57	94.93						
			$AgF.2H_2O$				
		4.47	162.0				
		5.68	162.0				
			$3AgF.5H_2O$*				
0.40	173.75	0.40	190.00	1.25	206.20		
3.60	174.00	8.10	189.00	7.90	202.50		
		13.25	188.00	12.65	198.60		
		14.80	189.80				

* Metastable at all temperatures studied. A number of determinations are given in (156) for other temperatures which are not easily classified. The solid $AgF.H_2O$ was obtained in a number of instances but always as a metastable form.

Transition temperatures

Solid phases	°C	g AgF/100g H_2O
$AgF.4H_2O$ + Ice	−14.2	60
$AgF.4H_2O + AgF.2H_2O$	+18.65	169.5
$AgF.2H_2O + AgF$	39.50	222
$AgF.H_2O + AgF$	38.20	223
$3AgF.5H_2O + AgF.H_2O$	27	224 *ca.*

$F^- \; Cb^{+++++} \; K^+$ (318)
$H_2O + HF + CbF_5 + KF$

°C	Solid phases	Liquid phase % CbF_5	% HF	% KF
16	$K_2CbOF_5.H_2O$	5.19	2.98	0.35
16	$K_2CbOF_5.H_2O + 2KF.CbF_5$	7.07	5.33	4.34
16	$2KF.CbF_5$	4.33	2.32	10.43
16	$K_2CbOF_5.H_2O$	1.16	5.54	−0.13*
16	$K_2CbOF_5.H_2O + 2KF.CbF_5$	2.67	6.04	5.39

$F^- \; Cb^{+++++} \; K^+$.—(*Continued*)

°C	Solid phases	Liquid phase % CbF_5	% HF	% KF
85	$K_2CbOF_5.H_2O$ + (?)	30.39	14.68	0.35
80	$K_2CbOF_5.H_2O$ + (?)	11.66	10.08	−1.53*

* Negative values indicate presence of oxyfluoride instead of pentafluoride as assumed in the calculations.

$F^- \; Ta^{+++++} \; K^+$ (318)
$H_2O + HF + TaF_5 + KF$

°C	Solid phases	Liquid phase % TaF_5	% KF	% HF
18	$K_xTa_yO_zF + 2KF.TaF_5$	0.25	0.12	0.029
18	$K_xTa_yO_zF + 2KF + TaF_5$	0.10	4.79	0.074
		0.09	6.73	0.015
16	$2KF.TaF_5$	1.33	0.56	4.47
18	$2KF.TaF_5$	1.24	0.52	4.20
18.5	$2KF.TaF_5$	5.35	2.25	24.30
18	$2KF.TaF_5$	0.036	21.93	10.44
85	$K_xTa_yO_zF + 2KF.TaF_5$	2.18	1.69	0.85
		0.96	5.27	1.17
90	$2KF.TaF_5$	5.73	2.41	4.47
		6.00	2.52	4.2
		10.91	4.59	24.30
		1.18	22.42	10.44

$F^- \; Na^+$
$H_2O + HF + NaF$
t = 25°C (74)

% H_2F_2	% Na_2F_2
Na_2F_2	
0.0	4.03
1.0	3.9
4.4	2.1
$NaHF_2$ (?)	
7.7	2.0
11.5	2.08
37.3	2.9
43.7	4.5

t = 20°C (224)
g per 100g H_2O

H_2F_2	Na_2F_2
Na_2F_2	
0.081	4.14
0.104	4.19
0.135	4.23
0.420	4.51
$Na_2F_2 + NaHF_2$*	
0.484*	4.56*
$NaHF_2$	
0.660	3.45
0.831	2.99
1.20	2.49
1.55	2.20
2.22	2.04
2.70	2.01
4.17	1.88
8.68	1.83
10.28	1.79

* Mean of six determinations.

$F^- \; K^+$
$H_2O + HF + KF$
t = 25°C (74)

% H_2F_2	% K_2F_2
K_2F_2	
0.0	48.0
1.5	37.5
5.7	22.3
11.1	21.3
KHF_2 (?)	
13.8	22.3
17.2	24.1
22.3	26.7
30.0	30.0
50.0	40.5

$Cl^- \; ClO_4^- \; K^+$
$H_2O + KCl + KClO_4$
t = 25°C (280)

% KCl	% $KClO_4$
$KClO_4$	
0	2.052
0.3663	1.755
0.7315	1.537

$Cl^- \; Br^- \; Pb^{++}$
$H_2O + PbCl_2 + PbBr_2$
t = ? (263); *v.* Fig. 1
% $PbBr_2$

Solid phase	Liquid phase
2.3	0.9
3.1	0.3
4.4	1.4
4.6	1.1
4.8	1.9
5.1	1.0
5.2	2.0
6.9	3 0

Cl^- Br^- Pb^{++}.—(*Continued*)

% $PbBr_2$	
Solid phase	Liquid phase
7.1	1.4
9.9	1.9
13.5	3.4
15.9	5.1
20.1	5.9
22.5	7.6
28.2	9.7
47.7	27.3
52.9	36.6
54.6	46.5
58.2	64.8
58.6	69.2
64.0	79.1

Cl^- Br^- Pb^{++} Ca^{++}

$H_2O + PbCl_2 + CaBr_2$

$t = 25°C$ (181)

M ½$CaCl_2$/l	M ½$PbBr_2$/l
$PbBr_2$	
0.00	0.05250
0.49	0.00924
0.98	0.01088
1.97	0.01386
2.95	0.02714
3.93	0.04710
M ½$CaBr_2$/l	M ½$PbCl_2$/l
$PbCl_2$	
0.0	0.07790
0.47	0.01362
0.95	0.02130
1.91	0.07574
2.85	0.18836
3.81	0.43460

Cl^- Br^- Pb^{++} Sr^{++}

$H_2O + PbBr_2 + SrCl_2$

$t = 25°C$ (181)

M ½$SrBr_2$/l	M ½$PbCl_2$/l
$PbCl_2$	
0.00	0.07790
0.52	0.01258
1.04	0.02278
2.08	0.09750
3.12	0.27940
4.16	0.79860
M ½$SrCl_2$/l	M ½$PbBr_2$/l
$PbBr_2$	
0.0	0.05250
0.660	0.01128
1.330	0.01254
2.66	0.03090
3.09	0.04000
4.18	0.05436

Cl^- Br^- Pb^{++} Ba^{++}

$H_2O + PbCl_2 + BaBr_2$

$t = 25°C$ (181)

M ½$BaBr_2$/l	M ½$PbCl_2$/l
$PbCl_2$	
0.00	0.07790
0.45	0.01206
0.91	0.02192
1.83	0.07716
2.70	0.25340
3.67	0.59200

Cl^- Br^- Pb^{++} Ba^{++}.—(*Cont'd*)

M ½$BaCl_2$/l	M ½$PbBr_2$/l
$PbBr_2$	
0.0	0.0525
0.52	0.01148
1.04	0.01530
2.08	0.04776

Cl^- Br^- Pb^{++} Na^+

$H_2O + PbBr_2 + NaCl$

$t = 25°C$ (181)

M_{NaBr}/l	M ½$PbCl_2$/l
$PbCl_2$	
0.00	0.0779
0.48	0.01394
0.97	0.02420
1.94	0.11864
2.82	0.28620
3.78	0.63710
M_{NaCl}/l	M ½$PbBr_2$/l
$PbBr_2$	
0.0	0.05250
0.47	0.00912
0.95	0.1127
1.89	0.01688
2.84	0.02932
3.79	0.06106
4.74	0.12288

Cl^- Br^- Pb^{++} K^+

$H_2O + PbBr_2 + KCl$

$t = 25°C$ (181)

M_{KCl}/l	M ½$PbBr_2$/l
$PbBr_2$	
0.00	0.05250
0.48	0.01112
0.97	0.01164
1.94	0.01240
2.91	0.02114
3.88	0.03010
M_{KBr}/l	M ½$PbCl_2$/l
$PbCl_2$	
0.0	0.07790
0.53	0.01578
1.07	0.01776
2.14	0.05034
3.21	0.13410
4.28	0.35480

Cl^- Br^- Sr^{++}

$H_2O + HBr + SrCl_2$

$t = 25°C$ (161)

M per 1000g H_2O

HBr	0.5$SrCl_2$
$SrCl_2.6H_2O$	
0.0	7.034
0.06817	6.974
0.4191	6.696
0.9716	6.262
1.154	6.132

Cl^- Br^- K^+

$H_2O + HBr + KCl$

$t = 25°C$ (179)

M_H/l	M_{KCl}/l
KCl	
0	4.272
0.661	3.780
3.415	1.957

Cl^- Br^- K^+

$H_2O + KCl + KBr$

$t = 25°C$ (3) *v.* Fig. 2

Solid phase % KCl	Liquid phase—g per 100g H_2O KCl	KBr
KBr		
0.0	0.0	68.47
Solid soln.		
3.9	5.43	62.26
8.3	8.46	58.50
13.09	12.48	52.45
23.02	17.17	45.42
44.77	20.18	40.53
50.93	21.23	38.70
74.43	24.21	31.53
80.98	25.88	26.62
92.48	31.02	12.94
KCl		
	36.12	0.0

Cl^- I^- Pb^{++} Na^+

$H_2O + PbI_2 + NaCl$

$t = 25°C$ (51.5)

% PbI_2	% NaCl
PbI_2	
0.758	0.0
0.778	0.29
0.859	0.59
0.951	1.16
1.100	2.30
1.410	5.86
1.640	11.70
1.790	29.80

Cl^- I^- Sr^{++}

$H_2O + HCl + SrI_2$

$t = 25°C$ (161)

M per 1000g H_2O

HI	0.5$SrCl_2$
$SrCl_2.6H_2O$	
0.0	7.034
0.1641	6.890
0.4462	6.650
0.4126	6.672
0.7539	6.366

Cl^- I^- Sr^{++} K^+

$H_2O + SrI_2 + KCl$

$t = 25°C$ (161)

M per 1000g H_2O

KI	0.5$SrCl_2$
$SrCl_2.6H_2O$	
0.0	7.034
0.09199	7.034
0.5401	7.016
0.6015	7.038
1.445	6.992

Cl^- I^- K^+

$H_2O + KCl + KI$

$t = 25°C$ (3) *v.* Fig. 3

g KCl/100g H_2O	g KI/100g H_2O
KI	
0.0	149.26

Cl^- I^- K^+.—(*Cont'd*)

g KCl/100g H_2O	g KI/100g H_2O
Solid soln. I*	
4.06	144.03
4.51	142.01
7.63	137.79
Solid soln. I* + Solid soln. II†	
11.57‡	133.17‡
Solid soln. II†	
15.10	105.91
23.75	43.89
31.38	14.83
33.65	7.11
KCl	
36.12	0.0

* Solid soln. I contains from 0 to 2.23 % KCl.

† Solid soln. II from 98.37 to 100 % KCl.

‡ Average of three results.

Cl^- SO_4^{--} NH_4^+, *v.* p. 276

Cl^- SO_4^{--} NH_4^+ Cu^{++}, *v.* p. 276

Cl^- SO_4^{--} NH_4^+ Ca^{++}

$H_2O + NH_4Cl + CaSO_4$

$t = 25°C$ (62)

g NH_4Cl/l	g $CaSO_4$/l
$CaSO_4.2H_2O$	
10.8	3.9
24.2	5.38
46.7	7.07
94.5	8.80
149.7	10.30
198.6	10.85
210.0	10.88
275.0	10.60
325.0	9.40
$CaSO_4.2H_2O$ + NH_4Cl	
375.3	7.38

Cl^- SO_4^{--} NH_4^+ Na^+, *v.* p. 276, 277

Cl^- SO_4^{--} CO_3^{--} Ca^{++} Na^+

$H_2O + CaCO_3 + NaCl + Na_2SO_4$

$t = 25°C$ (59)

% NaCl	% Na_2SO_4	% $CaCO_3$
$CaCO_3$		
0.0	22.16	0.0186
1.617	20.59	0.0149
5.318	17.928	0.0105
8.157	16.170	0.0101
8.257	15.908	0.0103
11.803	14.741	0.0087
13.707	14.821	0.0085
19.147	9.034	0.0032
22.067	7.085	0.0032
22.240	7.198	0.0029
23.008	5.472	0.0031
25.412	1.713	0.0031
26.308		0.0026

Cl^- SO_4^{--} NH_4^+ (311)

$H_2O + NH_4Cl + (NH_4)_2SO_4$; A = NH_4Cl; B = $(NH_4)_2SO_4$

Solid phases	Liquid phase											
	t = 0°C		t = 25°C		t = 30°C (340)		t = 40°C		t = 60°C		t = 80°C	
	% A	% B	% A	% B	% A	% B	% A	% B	% A	% B	% A	% B
NH_4Cl	22.9	0	28.2	0	29.5		31.40	0	35.60	0	39.6	0
	17.10	13.9	22.90	11.70	24.06	12.72			29.5	11.6		
					19.97	21.30						
$NH_4Cl + (NH_4)_2SO_4$	11.30	28.40	16.40	26.2	17.76	25.75	19.4	24.8	23.6	25.80	27.4	23.2
$(NH_4)_2SO_4$	0	41.4	0	43.4	14.62	28.60	0	44.8	0	46.8	0	48.8
					6.86	36.15						
						44.0						

Cl^- SO_4^{--} NH_4^+ Cu^{++}

$H_2O + NH_4Cl + CuSO_4$

t = 30°C (340) *v.* Fig. 4

	Solid phases	Liquid phase—M per 1000M H_2O			
		NH_4Cl	0.5 $(NH_4)_2SO_4$	0.5$CuCl_2$	0.5$CuSO_4$
A	$CuSO_4.5H_2O$				57.51
B	$CuCl_2.2H_2O + CuSO_4.5H_2O$			209.37	12.00
C	$CuCl_2.2H_2O$			209.86	
D	$CuCl_2.2H_2O + 2NH_4Cl.CuCl_2.2H_2O$	12.46		211.34	
E	$NH_4Cl + 2NH_4Cl.CuCl_2.2H_2O$	138.57		7.32	
F	NH_4Cl	140.78			
G	$NH_4Cl + (NH_4)_2SO_4$	105.77	124.20		
H	$(NH_4)_2SO_4$		214.11		
I	$(NH_4)_2SO_4 + (NH_4)_2SO_4.CuSO_4.6H_2O$		209.93		1.96
J	$CuSO_4.5H_2O + (NH_4)_2SO_4.CuSO_4.6H_2O$		21.41		62.83
P	$NH_4Cl + (NH_4)_2SO_4 + (NH_4)_2SO_4.CuSO_4.6H_2O$	105.37	125.62		3.53
Q	$NH_4Cl + (NH_4)_2SO_4.CuSO_4.6H_2O + 2NH_4Cl.CuCl_2.2H_2O$	134.90	38.05		12.96
R	$CuSO_4.5H_2O + (NH_4)_2SO_4.CuSO_4.6H_2O + 2NH_4Cl.CuCl_2.2H_2O$	5.53	36.24	111.67	
S	$CuSO_4.5H_2O + CuCl_2.2H_2O + 2NH_4Cl.CuCl_2.2H_2O$		13.39	219.10	0.33

Cl^- SO_4^{--} NH_4^+ Na^+ (311)

$H_2O + NH_4Cl + Na_2SO_4$; *v.* Figs. 5, 6

	Solid phases	Liquid phase—M per 1000 M H_2O							
		t = 0°C; *v.* Fig. 5				t = 25°C			
		NH_4Cl	0.5$(NH_4)_2SO_4$	NaCl	0.5Na_2SO_4	NH_4Cl	0.5$(NH_4)_2SO_4$	NaCl	0.5Na_2SO_4
A	NH_4Cl	99.9				132.1			
B	$NH_4Cl + (NH_4)_2SO_4$	63.2	128.5			96.1	124.3		
C	$(NH_4)_2SO_4$		192.5				208.9		
D	$(NH_4)_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$		181.6		19.9		193.6		37.1
E	$(NH_4)_2SO_4.Na_2SO_4.4H_2O + Na_2SO_4.10H_2O$		127.2		30.6		60.4		103.7
F	$Na_2SO_4.10H_2O$				12.78				71.0
	$Na_2SO_4 + Na_2SO_4.10H_2O$							61.0	54.2
	$Na_2SO_4 + NaCl$							97.6	24.7
G	$Na_2SO_4.10H_2O + NaCl$			106.4	4.9				
H	$NaCl$			109.9				110.4	
I	$NaCl + NH_4Cl$	49.0		87.7		79.7		78.5	
P	$NaCl + NH_4Cl + Na_2SO_4.10H_2O$	50.5		82.6	10.3				
Q	$NH_4Cl + Na_2SO_4.10H_2O + (NH_4)_2SO_4.Na_2SO_4.4H_2O$	86.1	24.9		37.9				
R	$NH_4Cl + (NH_4)_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$	60.4		124.4	18.6				
	$NaCl + NH_4Cl + Na_2SO_4$					90.8		48.9	44.3
	$NH_4Cl + Na_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$					103.8		24.6	62.0
	$NH_4Cl + (NH_4)_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$					90.3	115.3		33.8
	$Na_2SO_4 + Na_2SO_4.10H_2O + (NH_4)_2SO_4.Na_2SO_4.4H_2O$					15.3	42.2		107.9

Cl^- SO_4^{--} NH_4^+ Na^+.—(*Continued*)

	Solid phases	Liquid phase—M per 1000 M H_2O											
		t = 40°C; *v.* Fig. 6				t = 60°C				t = 80°C			
		NH_4Cl	$0.5(NH_4)_2SO_4$	NaCl	$0.5Na_2SO_4$	NH_4Cl	$0.5(NH_4)_2SO_4$	NaCl	$0.5Na_2SO_4$	NH_4Cl	$0.5(NH_4)_2SO_4$	NaCl	$0.5Na_2SO_4$
A	NH_4Cl	154.0				186.0				220.6			
B	$NH_4Cl + (NH_4)_2SO_4$	117.0	121.0			156 9	138.9			186.5	128.0		
C	$(NH_4)_2SO_4$		221.1				239.7				259.8		
D	$(NH_4)_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$		205.0		49.9								
E	$Na_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$		94.5		102.5								
	$(NH_4)_2SO_4 + Na_2SO_4$						210.7		87.5		235.0		89.9
F	Na_2SO_4				122.0				114.9				110.0
G	$Na_2SO_4 + NaCl$			103.4	22.0			107.7	18.8			111.7	18.46
H	NaCl			112.1				114.9				116.8	
I	$NaCl + NH_4Cl$	100.3		73.3		137.1		80.7		169.7		63.1	
R	$NH_4Cl + (NH_4)_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$	109.3	109.3		51.9								
S	$NH_4Cl + Na_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$	128.3	33.3		74.7								
T	$NaCl + NH_4Cl + Na_2SO_4$	114.0		42.2	44.8	152.2		33.6	50.4	197.4		19.8	59.6
	$NH_4Cl + Na_2SO_4 + (NH_4)_2SO_4$					142.1	108.9		63.0	188.0	83.1		68.1

Transition points

Solid phases	°C	Liquid phase—M per 1000M H_2O			
		NH_4Cl	$0.5(NH_4)_2SO_4$	NaCl	$0.5Na_2SO_4$
$NH_4Cl + (NH_4)_2SO_4 + Na_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$	50	122.2	107.4		66.5
$NH_4Cl + NaCl + Na_2SO_4 + Na_2SO_4.10H_2O$	11.3	71.5		54.4	47.3
$NH_4Cl + Na_2SO_4 + Na_2SO_4.10H_2O + (NH_4)_2SO_4.Na_2SO_4.4H_2O$	11 *ca.*	69.6		58.9	45.9

Cl^- SO_4^{--} Th^{++++}; Cl^- SO_4^{--} Tl^+; Cl^- SO_4^{--} Tl^+ K^+; *v.* p. 278

Cl^- SO_4^{--} Cu^{++} (340, 345): $H_2O + CuCl_2 + CuSO_4$

Solid phases	Liquid phase							
	t = 15°C		t = 25°C		t = 30°C		t = 35°C	
	% $CuCl_2$	% $CuSO_4$	% $CuCl_2$	% $CuSO_4$	% $CuCl_2$	% $CuSO_4$	% $CuCl_2$	% $CuSO_4$
$CuCl_2.2H_2O$	42.27	0.0	43.37	0.0	43.95	0.0	44.47	0.0
					43.25	1.14		
$CuCl_2.2H_2O + CuSO_4.5H_2O$	41.22	1.34	41.72	2.32	43.62	2.90	42.11	3.22
$CuSO_4.5H_2O$		16.03		18.22	39.48	3.21		21.05
					25.67	4.77		
					15.88	8.93		
					6.58	13.62		
					0.0	20.32		

Cl^- SO_4^{--} Cu^{++} Li^+; *v.* p. 278

Cl^- SO_4^{--} Cu^{++} Na^+ (345): $H_2O + CuCl_2 + Na_2SO_4$; *v.* Fig. 7

	Solid phases	Liquid phase—M per 1000M H_2O											
		t = 15°C				t = 25°C				t = 35°C			
		$0.5CuSO_4$	$0.5CuCl_2$	$0.5Na_2SO_4$	NaCl	$0.5CuSO_4$	$0.5CuCl_2$	$0.5Na_2SO_4$	NaCl	$0.5CuSO_4$	$0.5CuCl_2$	$0.5Na_2SO_4$	NaCl
A	$CuSO_4.5H_2O$	43.1				50.3				60.2			
B	$CuSO_4.5H_2O + CuCl_2.2H_2O$	5.1	192.2			9.4	199.7			13.1	206.4		
C	$CuCl_2.2H_2O$		196.2				205.2				214.5		
D	$CuCl_2.2H_2O + NaCl$		176.2		57.9		184.1		62.7		197.0		65.7
E	NaCl				110.1				111.6				111.4
F	$NaCl + Na_2SO_4$							24.7	100.2			22.1	102.6
	$NaCl + Na_2SO_4.10H_2O$			20.2	101.6								
G	$Na_2SO_4 + Na_2SO_4.10H_2O$							54.3	59.8				
	Na_2SO_4											125.2	
H	$Na_2SO_4.10H_2O$			33.3				71.0					
	$Na_2SO_4 + Na_2Cu(SO_4)_2.2H_2O$									5.0		122.5	
	$Na_2SO_4.10H_2O + CuSO_4.5H_2O$	46.7		40.3									
	$Na_2Cu(SO_4)_2.2H_2O + CuSO_4.5H_2O + Na_2SO_4.10H_2O$	42.5		22.8	20.2								
I	$Na_2SO_4.10H_2O + Na_2Cu(SO_4)_2.2H_2O$					19.6		74.2					
J	$Na_2Cu(SO_4)_2.2H_2O + CuSO_4.5H_2O$					52.7		38.3		60.6		31.7	
P	$Na_2Cu(SO_4)_2.2H_2O + Na_2SO_4.10H_2O + Na_2SO_4$					3.9		53.9	59.9				

Cl^- SO_4^{--} Cu^{++} Na^+.—(*Continued*)

	Solid phases	t = 15°C 0.5CuSO₄	t = 15°C 0.5CuCl₂	t = 15°C 0.5Na₂SO₄	t = 15°C NaCl	t = 25°C 0.5CuSO₄	t = 25°C 0.5CuCl₂	t = 25°C 0.5Na₂SO₄	t = 25°C NaCl	t = 35°C 0.5CuSO₄	t = 35°C 0.5CuCl₂	t = 35°C 0.5Na₂SO₄	t = 35°C NaCl
		Liquid phase—M per 1000M H_2O											
Q	$Na_2Cu(SO_4)_2.2H_2O + Na_2SO_4 + NaCl$					7.9		27.0	96.3	10.3		13.6	108
	$Na_2Cu(SO_4)_2.2H_2O + Na_2SO_4.10H_2O + NaCl$	10.5		12.7	105.7								
R	$Na_2Cu(SO_4)_2.2H_2O + NaCl + CuCl_2.2H_2O$	5.8	171.2		57.4	6.4	179.8		63.0	6.8	192.5		70.0
S	$Na_2Cu(SO_4)_2.2H_2O + CuCl_2.2H_2O + CuSO_4.5H_2O$	10.1	176.8		34.7	13.1	187.8		27.3	17.3	196.6		21.1

Cl^- SO_4^{--} Cu^{++} K^+: $H_2O + CuCl_2 + K_2SO_4$; *v.* Fig. 8; t = 30°C ([349])

	Solid phases	0.5CuCl₂	0.5CuSO₄	KCl	0.5K₂SO₄
		Liquid phase—M per 1000M H_2O			
A	$CuSO_4.5H_2O$		57.50		
B	$CuSO_4.5H_2O + CuCl_2.2H_2O$	210.86	12.00		
C	$CuCl_2.2H_2O$	209.90			
D	$CuCl_2.2H_2O + CuCl_2.2KCl.2H_2O$	238.02		41.95	
E	$CuCl_2.2KCl.2H_2O + KCl$	100.12		85.91	
F	KCl			90.30	
G	$KCl + K_2SO_4$			86.96	3.03
H	K_2SO_4				26.96
I	$K_2SO_4 + CuSO_4.K_2SO_4.6H_2O$		4.27		28.87
J	$CuSO_4.K_2SO_4.6H_2O + CuSO_4.5H_2O$		61.31		9.94
P	$K_2SO_4 + CuSO_4.K_2SO_4.6H_2O + CuCl_2.K_2SO_4.H_2O$*	35.94		68.06	9.74
Q	$K_2SO_4 + KCl + CuCl_2.K_2SO_4.H_2O$	26.10	7.00	89.35	
R	$CuCl_2.K_2SO_4.H_2O + CuSO_4.5H_2O + CuSO_4.K_2SO_4.6H_2O$	101.82	26.91	24.15	
S	$KCl + CuCl_2.2KCl.2H_2O + CuCl_2.K_2SO_4.H_2O$	101.96		83.80	2.19
T	$CuSO_4.5H_2O + CuCl_2.2H_2O + CuCl_2.K_2SO_4.H_2O$	213.96	15.30	20.47	
U	$CuCl_2.2KCl.2H_2O + CuCl_2.2H_2O + CuCl_2.K_2SO_4.H_2O$	233.34	4.32	38.93	

* This salt may be anhydrous; it is possible that there are several salts instead of one, stable within the field assigned to it.

Cl^- SO_4^{--} Th^{++++}

$H_2O + HCl + Th(SO_4)_2$

t = 30°C ([235])

% HCl	% $Th(SO_4)_2$
$Th(SO_4)_2.8H_2O$	
0	2.15
4.55	3.541
6.95	3.431
12.14	2.811
15.71	2.360
18.33	2.199
20.00	2.110
23.9	1.277

Cl^- SO_4^{--} Tl^+

$H_2O + TlCl + Tl_2SO_4$

t = 25°C ([40])

M_{TlCl}/l	M ½Tl_2SO_4/l
TlCl	
0.01607	0.0
0.01034	0.0200
0.006772	0.0500
0.004679	0.1000

Cl^- SO_4^{--} Tl^+ K^+

$H_2O + Tl_2SO_4 + KCl$

t = 25°C ([40])

M ½K_2SO_4/l	M_{TlCl}/l
TlCl	
0.0	0.01607
0.01997	0.01779
0.0500	0.01942
0.1000	0.02137
0.3000	0.02600
1.0000	0.03416

(The last three rows are printed at the head of the next column as Cl^- SO_4^{--} Tl^+ K^+.—(*Continued*).)

Cl^- SO_4^{--} Cu^{++} Li^+

$H_2O + CuCl_2 + Li_2SO_4$

t = 25°C ([176])

M_{LiCl}/l	M_{CuSO_4}/l
$CuSO_4.5H_2O$	
2.83	1.067
1.40	1.176
0.73	1.257
0.0	1.399

Cl^- SO_4^{--} Cu^{++} Rb^+

$H_2O + CuCl_2 + Rb_2SO_4$

t = 25°C ([176])

M_{RbCl}/l	M_{CuSO_4}/l
$CuSO_4.5H_2O$	
1.094	1.568
0.0	1.399

Cl^- SO_4^{--} Mg^{++}

$H_2O + MgCl_2 + MgSO_4$ ([36, 192, 193, 241, 257, 375])

Solid phases	t = 0°C % MgCl₂	t = 0°C % MgSO₄	t = 25°C % MgCl₂	t = 25°C % MgSO₄
	Liquid phase			
$MgSO_4.7H_2O$		20.63		26.68
	3.94	14.95	0.60	25.80
	10.01	9.08	10.50	14.00
	17.68	4.23	16.20	8.66
	27.05	1.67	21.61	6.30
$MgSO_4.7H_2O + MgCl_2.6H_2O$	33.55	1.47		
$MgSO_4.7H_2O + MgSO_4.6H_2O$			27.69*	4.33*
			26.06†	5.01†
$MgSO_4.6H_2O$			31.02	3.71
$MgSO_4.6H_2O + MgCl_2.6H_2O$			34.20m?	2.29m?
$MgSO_4.6H_2O + MgSO_4.5H_2O$			30.79	3.87
$MgSO_4.5H_2O + MgSO_4.4H_2O$			33.02	2.82
$MgSO_4.4H_2O + MgCl_2.6H_2O$			33.96	2.98
$MgCl_2.6H_2O$	34.56		35.91	
	t = 105°C		Invariant point t = 116.67° ([192])	
$MgSO_4.H_2O$		33.85	46.12	?
	39.12	0.80		
$MgSO_4.H_2O + MgCl_2.6H_2O$	42.04	0.57		
$MgCl_2.6H_2O$	42.44			

* Blasdale ([36]). † Takegami ([375]).

Cl^- SO_4^{--} Mg^{++} Ca^{++}: $H_2O + MgSO_4 + CaCl_2$; t = 26°C ([68])

g $CaSO_4$/l	g $MgCl_2$/l	g $CaSO_4$/l	g $MgCl_2$/l
$CaSO_4.2H_2O$			
2.082	0	8.622	121.381
4.258	8.501	6.567	206.985
5.692	19.175	2.774	336.986
7.588	46.640	1.385	441.128

Cl^- SO_4^{--} Mg^{++} Ca^{++} Na^+ K^+

$H_2O + MgCl_2 + CaCl_2 + Na_2SO_4 + KCl$; *v.* Figs. 9, 10, 11, 12 (97, 194, 195)

	Solid phases	Liquid phase—M per 1000M H_2O					
		NaCl	KCl	$0.5MgCl_2$	$0.5MgSO_4$	$0.5Na_2SO_4$	$0.5CaSO_4$
	$t = 0°C$ (97); *v.* Fig. 9						
A	$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O + NaCl + KCl$	93.6	25.0			0.34	1.52
B	$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O + NaCl + Na_2SO_4.10H_2O$	99.8	16.0			5.20	0.64
	$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O + NaCl$	98.0	23.2			2.20	1.0
D	$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O + NaCl + KCl + MgSO_4.K_2SO_4.6H_2O$	36.4	16.0	62.6	20.0		0.12
E	$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O + NaCl + Na_2SO_4.10H_2O + MgSO_4.K_2SO_4.6H_2O$			Position on diagram assumed			
	$t = 25°C$ (97, 194); *v.* Fig. 10						
A	$CaSO_4 + CaSO_4.Na_2SO_4 + NaCl$	108.0				6.0	0.5
B	$CaSO_4.K_2SO_4.H_2O + CaSO_4.Na_2SO_4 + Na_2SO_4 + NaCl$	94.0	11.0			28.0	0
C	$CaSO_4 + CaSO_4.K_2SO_4.H_2O + KCl + NaCl$	92.0	39.0				1.4
D	$CaSO_4.Na_2SO_4 + CaSO_4.K_2SO_4.H_2O + Na_2SO_4 + NaCl + MgSO_4.Na_2SO_4.4H_2O$	50.0	17.0	33.0		44.0	
E*	$CaSO_4.K_2SO_4.H_2O + CaSO_4.Na_2SO_4 + K_2SO_4.MgSO_4.2CaSO_4.2H_2O + NaCl + MgSO_4.Na_2SO_4.4H_2O$	46.2	14.4	63.4	38.8		0.58
G*	$CaSO_4.K_2SO_4.H_2O + K_2SO_4.MgSO_4.2CaSO_4.2H_2O + NaCl + KCl + K_2SO_4.MgSO_4.4H_2O$	22.2	17.6	92.4	29.0		1.22
I*	$CaSO_4 + K_2SO_4.MgSO_4.2CaSO_4.2H_2O + NaCl + KCl + MgSO_4.KCl.3H_2O$	4.0	13.0	134.2	11.8		0.16
J	$CaSO_4 + K_2SO_4.MgSO_4.2CaSO_4.2H_2O + MgSO_4.7H_2O + NaCl + MgSO_4.KCl.3H_2O$	14.0	13.0	104.0	35.0		1.6
	Positions of points F, H, K, L, Q on diagrams assumed						
	$t = 55°C$ (97); *v.* Fig. 11						
A	$CaSO_4 + CaSO_4.Na_2SO_4 + NaCl$	113.6				0.40	1.8
B	$CaSO_4.Na_2SO_4 + CaSO_4.K_2SO_4.H_2O + NaCl + K_3Na(SO_4)_2$	89.6	35.4			16.8	0.2
C	$CaSO_4.K_2SO_4.H_2O + NaCl + KCl + K_3Na(SO_4)_2$	83.0	58.6			8.2	0.154
D	$CaSO_4.K_2SO_4.H_2O + 5CaSO_4.K_2SO_4.H_2O + NaCl + KCl$	88.4	57.8			1.0	1.2
E	$5CaSO_4.K_2SO_4.H_2O + NaCl + KCl$	78.0	56.8	10†			0.66
F	$CaSO_4 + 5CaSO_4.K_2SO_4.H_2O + CaSO_4.Na_2SO_4 + NaCl$	96.2	28.0			5.0	0.94
G	$CaSO_4.K_2SO_4.H_2O + 5CaSO_4.K_2SO_4.H_2O + CaSO_4.Na_2SO_4 + NaCl$	95.6	31.4			8.4	0.42
P	$CaSO_4.Na_2SO_4 + CaSO_4.K_2SO_4.H_2O + K_2SO_4.MgSO_4.2CaSO_4.2H_2O + NaCl + K_3Na(SO_4)_2$	84.0	33.8		7.8	9.4	0.38
R	$CaSO_4.K_2SO_4.H_2O + 5CaSO_4.K_2SO_4.H_2O + KCl + NaCl + K_2SO_4.MgSO_4.2CaSO_4.2H_2O$	85.6	56.4	0.6	4.2		0.16
S	$CaSO_4$? $+ 5CaSO_4.K_2SO_4.H_2O + K_2SO_4.MgSO_4.2CaSO_4.2H_2O + KCl + NaCl$	84.8	55.8	5.2	0.4		1.56
T	$CaSO_4.K_2SO_4.H_2O + CaSO_4.Na_2SO_4 + K_2SO_4.MgSO_4.2CaSO_4.2H_2O + 5CaSO_4.K_2SO_4.H_2O + NaCl$	92.2	37.6	0.6	8.6		0.88
	$CaSO_4 + K_2SO_4.MgSO_4.2CaSO_4.2H_2O + KCl + MgKCl_3.6H_2O + NaCl$	9.6	17.0	153.0	0.18†		1.24
	$CaSO_4 + K_2SO_4.MgSO_4.2CaSO_4.2H_2O + NaCl + MgSO_4.H_2O + MgKCl_3.6H_2O$	3.8	5.6	173.6	9.2		0.44
	$CaSO_4 + CaSO_4.Na_2SO_4 + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O + NaCl$	16.4		88.0	36.2		0.32
	$CaSO_4.Na_2SO_4 + K_2SO_4.MgSO_4.2CaSO_4.2H_2O + MgSO_4.Na_2SO_4.4H_2O + NaCl$	83.8	29.2	2.0	41.8		0.06
	$t = 83°C$ (97, 195); *v.* Fig. 12						
A	$CaSO_4 + CaSO_4.Na_2SO_4 + NaCl$	117.4				2.6	0.58
B	$CaSO_4.Na_2SO_4 + CaSO_4.K_2SO_4.H_2O + NaCl + K_3Na(SO_4)_2$	81.0	67.0			13.0	
C	$CaSO_4.K_2SO_4.H_2O + 5CaSO_4.K_2SO_4.H_2O + NaCl + KCl$	81.0	77.0			4.0	0.36
D	$CaSO_4 + 5CaSO_4.K_2SO_4.H_2O + NaCl + KCl$	64.0	62.0	41.0‡			0.14
E	$CaSO_4 + CaSO_4.Na_2SO_4 + 5CaSO_4.K_2SO_4.H_2O + NaCl$	104.8	22.4			2.8	0.56
F	$CaSO_4.K_2SO_4.H_2O + CaSO_4.Na_2SO_4 + 5CaSO_4.K_2SO_4.H_2O + NaCl$	82.2	65.6			9.6	0.2
P	$CaSO_4 + CaSO_4.Na_2SO_4 + 5CaSO_4.K_2SO_4.H_2O + NaCl + K_2SO_4.MgSO_4.2CaSO_4.2H_2O$	90.4	37.8	7.6	5.8		0.40
Q	$CaSO_4.K_2SO_4.H_2O + CaSO_4.Na_2SO_4 + 5CaSO_4.K_2SO_4.H_2O + K_2SO_4.MgSO_4.2CaSO_4.2H_2O + NaCl$	78.2	70.0		5.6	5.8	0.20

* According to (194). † $CaCl_2$ instead of the salt listed in this column. On the diagram it is represented by the line used for the SO_4, but measured in the opposite direction starting from the origin. ‡ $CaCl_2$ instead of the salt listed in this column.

Cl^- SO_4^{--} Mg^{++} Ca^{++} Na^+ K^+.—(*Continued*)

In the accompanying diagrams (Figs. 9, 10, 11, and 12) the lighter lines outline the surfaces separating the spaces within which each of the different calcium-containing salts is in stable equilibrium with the solutions represented by different portions of the diagram. The data are in many cases incomplete, and those needed to indicate the spaces within which chloride-containing calcium compounds are stable, are entirely wanting.

The mineralogical names given to the calcium-containing salts listed are as follows:

Gypsum, $CaSO_4.2H_2O$; Anhydrite, $CaSO_4$; Glauberite, $CaSO_4.Na_2SO_4$; Syngenite, $K_2SO_4.CaSO_4.H_2O$; Polyhalite, $K_2SO_4.MgSO_4.2CaSO_4.2H_2O$.

Cl^- SO_4^{--} Mg^{++} Na^+

$H_2O + MgCl_2 + Na_2SO_4$; *v.* Figs. 13, 14, 15, 16, 17 (36, 97, 201, 241, 257, 375)

	Solid phases	Liquid phase—M per 1000M H_2O			
		$0.5MgCl_2$	$0.5MgSO_4$	NaCl	$0.5Na_2SO_4$
	t = 0°C (241); *v.* Fig. 13				
A	$MgSO_4.7H_2O$		77.8		
B	$MgSO_4.7H_2O + MgCl_2.6H_2O$	195.4	6.8		
C	$MgCl_2.6H_2O$	199.6			
D	$MgCl_2.6H_2O + NaCl$	196.0		3.4	
E	NaCl			109.8	
F	$NaCl + Na_2SO_4.10H_2O$			108.4	4.0
G	$Na_2SO_4.10H_2O$				12.6
H	$Na_2SO_4.10H_2O + MgSO_4.7H_2O$		77.0		13.0
L	$Na_2SO_4.10H_2O + NaCl + MgSO_4.7H_2O$	50.4	24.0	50.6	
M	$NaCl + MgSO_4.7H_2O + MgCl_2.6H_2O$	193.0	7.8	2.2	
	t = 0°C (97)				
L	$Na_2SO_4.10H_2O + NaCl + MgSO_4.7H_2O$	53.8	23.4	48.2	
M	$NaCl + MgSO_4.7H_2O + MgCl_2.6H_2O$	201.6	7.6	0.6	
	t = 25°C (36); *v.* Fig. 14				
A	$MgSO_4.7H_2O$		108.72		
B	$MgSO_4.7H_2O + MgSO_4.6H_2O$	154.0	19.06		
C	$MgSO_4.6H_2O + MgCl_2.6H_2O$	204.2	10.8		
D	$MgCl_2.6H_2O$	207.8			
E	$MgCl_2.6H_2O + NaCl$	207.8		Tr.	
F	NaCl			109.8	
G	$NaCl + Na_2SO_4$			99.12	24.88
H	$Na_2SO_4 + Na_2SO_4.10H_2O$			38.0	55.0
I	$Na_2SO_4.10H_2O$				70.82
J	$Na_2SO_4.10H_2O + Na_2SO_4.MgSO_4.4H_2O$		75.92		68.72
K	$Na_2SO_4.MgSO_4.4H_2O + MgSO_4.7H_2O$		95.98		49.94
L	$Na_2SO_4.10H_2O + Na_2SO_4 + Na_2SO_4.MgSO_4.4H_2O$		23.08	47.78	7.34
M	$Na_2SO_4 + NaCl + Na_2SO_4.MgSO_4.4H_2O$		37.68	91.44	2.56
N	$Na_2SO_4.MgSO_4.4H_2O + NaCl + MgSO_4.7H_2O$	77.42	36.0	30.16	
O	$MgSO_4.7H_2O + MgSO_4.6H_2O + NaCl$	151.0	19.56	6.78	
P	$MgSO_4.6H_2O + MgCl_2.6H_2O + NaCl$	203.7	7.56	0.56	
	t = 25°C (201)				
M	$Na_2SO_4 + NaCl + Na_2SO_4.MgSO_4.4H_2O$		33	92	6
N	$Na_2SO_4.MgSO_4.4H_2O + NaCl + MgSO_4.7H_2O$	14	68	52	
O	$MgSO_4.7H_2O + MgSO_4.6H_2O + NaCl$	106	30	21	
P	$MgSO_4.6H_2O + MgCl_2.6H_2O + NaCl$	104	10	2	
	t = 25°C (375)				
L	$Na_2SO_4.10H_2O + Na_2SO_4 + Na_2SO_4.MgSO_4.4H_2O$		61.58	20.32	64.50
M	$Na_2SO_4 + NaCl + Na_2SO_4.MgSO_4.4H_2O$		35.35	93.83	3.60
N	$Na_2SO_4.MgSO_4.4H_2O + NaCl + MgSO_4.7H_2O$	71.20	17.65		54.39
	t = 25°C (241)				
L	$Na_2SO_4.10H_2O + Na_2SO_4 + Na_2SO_4.MgSO_4.4H_2O$		34.40	60.8	33.2
M	$Na_2SO_4 + NaCl + Na_2SO_4.MgSO_4.4H_2O$		32.0	93.6	4.4
N	$Na_2SO_4.MgSO_4.4H_2O + NaCl + MgSO_4.7H_2O$	60.4	30.2	44.0	
O	$MgSO_4.7H_2O + MgSO_4.6H_2O + NaCl$	155.4	19.6	4.6	
P	$MgSO_4.6H_2O + MgCl_2.6H_2O + NaCl$	200.0	19.0	5.0	
	t = 25°C (97)				
M	$Na_2SO_4 + NaCl + Na_2SO_4.MgSO_4.4H_2O$		33.4	92.6	6.4
N	$NaCl + MgSO_4.7H_2O + Na_2SO_4.MgSO_4.4H_2O$	91.8	34.6	34.6	
O	$MgSO_4.7H_2O + NaCl + MgSO_4.6H_2O$	134.8	23.8	8.4	
	$NaCl + MgSO_4.6H_2O + MgSO_4.H_2O$	158.0	19.0	5.0	
	$NaCl + MgCl_2.6H_2O + MgSO_4.H_2O$	203.8	10.2	1.8	

Cl^- SO_4^{--} Mg^{++} Na^+.—(*Continued*)

	Solid phases	Liquid phase—M per 1000M H_2O			
		0.5$MgCl_2$	0.5$MgSO_4$	NaCl	0.5Na_2SO_4
	t = 55°C (97); *v.* Fig. 15				
A	$MgSO_4.6H_2O$		157.0		
D	$MgCl_2.6H_2O$	228.0			
E	$MgCl_2.6H_2O + NaCl$	227.6		1.4	
F	NaCl			113.0	
G	$NaCl + Na_2SO_4$			107.2	18.6
H	Na_2SO_4				117.0
I	$Na_2SO_4 + Na_2SO_4.MgSO_4.4H_2O$		67.8		90.2
J	$Na_2SO_4.MgSO_4.4H_2O + MgSO_4.6H_2O$		150.2		21.0
P	$NaCl + Na_2SO_4 + MgSO_4.3Na_2SO_4$	2.4	31.2	101.2	
Q	$NaCl + MgSO_4.3Na_2SO_4 + Na_2SO_4.MgSO_4.4H_2O$	17.2	30.8	82.8	
R	$NaCl + Na_2SO_4.MgSO_4.4H_2O + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O$	55.6	30.2	49.0	
S	$NaCl + MgSO_4.H_2O + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O$	133.4	26.2	14 0	
T	$NaCl + MgSO_4.H_2O + MgCl_2.6H_2O$	224.6	210.2	1.4	
	t = 83°C (97); *v.* Fig. 16				
A	$MgSO_4.H_2O$		190.3		
C	$MgCl_2.6H_2O$	246.0			
D	$MgCl_2.6H_2O + NaCl$	242		2.0	
E	NaCl			118.0	
F	$NaCl + Na_2SO_4$			112.0	16.8
G	Na_2SO_4				110.0
H	$Na_2SO_4 + MgSO_4.3Na_2SO_4$		(54)		(94)
I	$MgSO_4.3Na_2SO_4 + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O$		(84)		(60)
J	$MgSO_4.Na_2SO_4.\frac{5}{2}H_2O + MgSO_4.H_2O$		(136)		(26)
P	$NaCl + Na_2SO_4 + MgSO_4.3Na_2SO_4$	8.8	20.8	102.2	
Q	$NaCl + MgSO_4.3Na_2SO_4 + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O$	44.0	25.2	70.4	
R	$NaCl + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O + MgSO_4.H_2O$	90.0	22.0	36.0	
S	$NaCl + MgSO_4.H_2O + MgCl_2.6H_2O$	242.0	241.8	1.2	
	t = 105°C (257); *v.* Fig. 17				
A	$MgSO_4.H_2O$	0.0	153.2		
B		246.2	4.04		
C	$MgSO_4.H_2O + MgCl_2.6H_2O$	277.0	3.0		
D	$MgCl_2.6H_2O$	279.0			
E	$MgCl_2.6H_2O + NaCl$	279.0		Tr.	
F	NaCl			121.44	
G	$NaCl + Na_2SO_4$			115.92	16.11
H	Na_2SO_4				105.98
I	$Na_2SO_4 + 3Na_2SO_4.MgSO_4$		22.10		99.76
J*	$3Na_2SO_4.MgSO_4 + Na_2SO_4.MgSO_4.\frac{5}{2}H_2O$		83.68		64.44
K*	$Na_2SO_4.MgSO_4.\frac{5}{2}H_2O + MgSO_4.H_2O$		128.62		26.14
P	$Na_2SO_4 + NaCl + 3Na_2SO_4.MgSO_4$	9.26		105.56	14.78
Q	$3Na_2SO_4.MgSO_4 + NaCl + Na_2SO_4.MgSO_4.\frac{5}{2}H_2O$	67.28		54.04	20.24
R	$Na_2SO_4.MgSO_4.\frac{5}{2}H_2O + NaCl + MgSO_4.H_2O$	110.80		19.95	22.64

*At 103 instead of 105°C.

Invariant points (97)

°C	Solid phases
13	$MgCl_2.6H_2O + MgSO_4.7H_2O + MgSO_4.6H_2O + NaCl$
15	$Na_2SO_4.10H_2O + MgSO_4.7H_2O + Na_2SO_4.MgSO_4.4H_2O + NaCl$
15.5	$Na_2SO_4.10H_2O + Na_2SO_4 + Na_2SO_4.MgSO_4.4H_2O + NaCl$
18	$MgCl_2.6H_2O + MgSO_4.6H_2O + MgSO_4.H_2O + NaCl$
31	$MgSO_4.7H_2O + MgSO_4.6H_2O + Na_2SO_4.MgSO_4.4H_2O + NaCl$
35.5	$MgSO_4.6H_2O + MgSO_4.H_2O + Na_2SO_4.MgSO_4.4H_2O + NaCl$
49	$Na_2SO_4 + Na_2SO_4.MgSO_4.4H_2O + MgSO_4.3Na_2SO_4 + NaCl$
59	$Na_2SO_4.MgSO_4.4H_2O + MgSO_4.3Na_2SO_4 + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O + NaCl$

$Cl^- \ SO_4^{--} \ Mg^{++} \ Na^+ \ K^+$ (97, 189)

$H_2O + MgCl_2 + Na_2SO_4 + KCl$; *v.* Figs. 18, 19, 20, 21

	Solid phases in addition to NaCl	Liquid phase—M per 1000M H_2O				
		NaCl	KCl	$0.5MgCl_2$	$0.5MgSO_4$	$0.5Na_2SO_4$
	t = 0°C (97); *v.* Fig. 18					
A	$Na_2SO_4.10H_2O$	107.8				4.4
B	$Na_2SO_4.10H_2O + MgSO_4.7H_2O$	48.2		53.8	23.4	
C	$MgSO_4.7H_2O + MgCl_2.6H_2O$	0.6		201.6	7.6	
D	$MgCl_2.6H_2O$	(1.6)		198.2		
E	$MgCl_2.6H_2O + MgKCl_3.6H_2O$	(1.6)	0.4	198.0		
F	$MgKCl_3.6H_2O + KCl$	8.0	8.0	135.8		
G	KCl	101.6	25.0			
H	$KCl + Na_2SO_4.10H_2O$	95.0	26.4			6.8
P	$KCl + Na_2SO_4.10H_2O + K_2SO_4.MgSO_4.6H_2O$	51.0	19.2	45.0	21.6	
Q	$Na_2SO_4.10H_2O + K_2SO_4.MgSO_4.6H_2O + MgSO_4.7H_2O$	44.0	15.0	48.6	31.0	
R	$MgSO_4.7H_2O + K_2SO_4.MgSO_4.6H_2O + KCl$	14.8	12.4	100.2	14.8	
S	$MgSO_4.7H_2O + KCl + MgKCl_3.6H_2O$	6.2	9.2	130.0	9.0	
T	$MgSO_4.7H_2O + MgKCl_3.6H_2O + MgCl_2.6H_2O$	1.4	0.4	196.8	12.0	
	t = 25°C (189); *v.* Fig. 19					
A	Na_2SO_4	101.0				24.9
B	$Na_2SO_4 + Na_2SO_4.MgSO_4.4H_2O$	92.6			33.4	6.4
C	$Na_2SO_4.MgSO_4.4H_2O + MgSO_4.7H_2O$	34.6		91.8	34.6	
D	$MgSO_4.7H_2O + MgSO_4.6H_2O$	8.4		135.0	24.0	
E	$MgSO_4.6H_2O + MgSO_4.H_2O$	5.0		158.0	19.0	
F	$MgSO_4.H_2O + MgCl_2.6H_2O$	1.8		203.8	10.2	
G	$MgCl_2.6H_2O$	2.0		212.0		
H	$MgCl_2.6H_2O + MgKCl_3.6H_2O$	2.0	1.0	210.0		
I	$MgKCl_3.6H_2O + KCl$	4.0	11.0	141.0		
J	KCl	89.0	57.4			
K	$KCl + K_3Na(SO_4)_2$	88.0	40.0			9.0
L	$K_3Na(SO_4)_2 + Na_2SO_4$	88.0	21.0			29.0
M	$K_3Na(SO_4)_2 + Na_2SO_4.MgSO_4.4H_2O + Na_2SO_4$	84.0	16.0		32.0	12.0
N	$K_3Na(SO_4)_2 + K_2SO_4.MgSO_4.6H_2O + Na_2SO_4.MgSO_4.4H_2O$	55.0	21.0	33.0	37.0	
O	$K_3Na(SO_4)_2 + KCl + K_2SO_4.MgSO_4.6H_2O$	46.0	28.0	43.0	28.0	
P	$Na_2SO_4.MgSO_4.4H_2O + K_2SO_4.MgSO_4.6H_2O + K_2SO_4.MgSO_4.4H_2O$	44.0	21.0	46.0	38.0	
Q	$K_2SO_4.MgSO_4.6H_2O + K_2SO_4.MgSO_4.4H_2O + KCl$	39.0	29.0	51.0	29.0	
R	$Na_2SO_4.MgSO_4.4H_2O + K_2SO_4.MgSO_4.4H_2O + MgSO_4.7H_2O$	21.0	15.0	84.0	38.0	
S	$MgSO_4.7H_2O + K_2SO_4.MgSO_4.4H_2O + MgSO_4.KCl.3H_2O$	18.0	15.0	90.0	39.0	
T	$K_2SO_4.MgSO_4.4H_2O + KCl + MgSO_4.KCl.3H_2O$	19.0	19.0	94.0	29.0	
U	$MgSO_4.KCl.3H_2O + KCl + MgKCl_3.6H_2O$	5.0	12.0	136.0	10.0	
V	$MgSO_4.7H_2O + MgSO_4.6H_2O + MgSO_4.KCl.3H_2O$	7.0	8.0	131.0	26.0	
W	$MgSO_4.6H_2O + MgSO_4.H_2O + MgSO_4.KCl.3H_2O$	3.0	4.0	154.0	20.0	
X	$MgSO_4.H_2O + MgSO_4.KCl.3H_2O + MgKCl_3.6H_2O$	2.0	2.0	171.0	16.0	
Y	$MgSO_4.H_2O + MgKCl_3.6H_2O + MgCl_2.6H_2O$	2.0	1.0	200.0	10.0	
	t = 55°C (97); *v.* Fig. 20					
A	Na_2SO_4	107.2				18.6
B	$Na_2SO_4 + MgSO_4.3Na_2SO_4$	101.2		2.4	31.2	
C	$MgSO_4.3Na_2SO_4 + Na_2SO_4.MgSO_4.4H_2O$	82.8		17.2	30.8	
D	$Na_2SO_4.MgSO_4.4H_2O + Na_2SO_4.MgSO_4.\frac{5}{2}H_2O$	49.0		55.6	30.2	
E	$Na_2SO_4.MgSO_4.\frac{5}{2}H_2O + MgSO_4.H_2O$	14.0		133.4	26.2	
F	$MgSO_4.H_2O + MgCl_2.6H_2O$	1.4		224.6	9.2	
G	$MgCl_2.6H_2O$	1.4		227.6		
H	$MgCl_2.6H_2O + MgKCl_3.6H_2O$	1.4	1.0	228.0		
I	$MgKCl_3.6H_2O + KCl$	7.6	16.8	156.4		
J	KCl	89.0	57.4			
K	$KCl + K_3Na(SO_4)_2$	83.2	58.6			8.0
L	$K_3Na(SO_4)_2 + Na_2SO_4$	89.8	29.8			23.4
M	$Na_2SO_4 + K_3Na(SO_4)_2 + MgSO_4.3Na_2SO_4$	83.0	27.8		17.0	13.0
N	$MgSO_4.3Na_2SO_4 + K_3Na(SO_4)_2 + Na_2SO_4.MgSO_4.4H_2O$	81.2	29.8	3.0	41.0	
O	$K_3Na(SO_4)_2 + Na_2SO_4.MgSO_4.4H_2O + K_2SO_4.MgSO_4.4H_2O$	67.8	29.4	21.4	43.0	
P	$Na_2SO_4.MgSO_4.4H_2O + K_2SO_4.MgSO_4.4H_2O + Na_2SO_4.MgSO_4.\frac{5}{2}H_2O$	59.0	28.0	34.4	41.0	
Q	$Na_2SO_4.MgSO_4.\frac{5}{2}H_2O + K_2SO_4.MgSO_4.4H_2O + 2MgSO_4.K_2SO_4$	39.8	22.2	51.4	36.0	
R	$K_2SO_4.MgSO_4.4H_2O + K_3Na(SO_4)_2 + KCl$	48.6	43.6	43.8	31.6	
S	$K_2SO_4.MgSO_4.4H_2O + 2MgSO_4.K_2SO_4 + MgSO_4.KCl.3H_2O + KCl$	39.8	39.6	59.8	32.0	
T	$Na_2SO_4.MgSO_4.\frac{5}{2}H_2O + 2MgSO_4.K_2SO_4 + MgSO_4.H_2O$	12.2	13.2	123.2	25.6	

$Cl^- \; SO_4^{--} \; Mg^{++} \; Na^+ \; K^+$.—(*Continued*)

	Solid phases in addition to NaCl	Liquid phase—M per 1000M H_2O				
		NaCl	KCl	$0.5MgCl_2$	$0.5MgSO_4$	$0.5Na_2SO_4$
	t = 55°C.—(*Continued*)					
U	$2MgSO_4.K_2SO_4 + MgSO_4.KCl.3H_2O + MgSO_4.H_2O$	6.6	9.6	135.8	21.0	
V	$KCl + MgKCl_3.6H_2O + MgSO_4.KCl.3H_2O$	3.4	17.4	154.6	6.4	
W	$MgSO_4.KCl.3H_2O + MgKCl_3.6H_2O + MgSO_4.H_2O$	6.6	12.8	162.2	6.8	
X	$MgSO_4.H_2O + MgKCl_3.6H_2O + MgCl_2.6H_2O$	0.8	0.4	222.0	8.2	
	t = 83°C (189); *v*. Fig. 21					
A	Na_2SO_4	113.0				16.0
B	$Na_2SO_4 + MgSO_4.3Na_2SO_4$	102.0		8.8	20.8	
C	$MgSO_4.3Na_2SO_4 + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O$	70.4		44.0	25.2	
D	$MgSO_4.Na_2SO_4.\frac{5}{2}H_2O + MgSO_4.H_2O$	36.0		90.0	22.0	
E	$MgSO_4.H_2O + MgCl_2.6H_2O$	1.2		242.0	1.8	
F	$MgCl_2.6H_2O$	2.0		242.0		
G	$MgCl_2.6H_2O + MgKCl_3.6H_2O$	2.0	4.0	234.0		
H	$MgKCl_3.6H_2O + KCl$	2.6	20.0	183.8		
I	KCl	81.2	78.0			
J	$KCl + K_3Na(SO_4)_2$	79.0	78.0			9.0
K	$K_3Na(SO_4)_2 + Na_2SO_4$	87.0	42.0			22.6
P	$K_3Na(SO_4)_2 + Na_2SO_4 + MgSO_4.3Na_2SO_4$	86.0	45.0		15.0	11.0
Q	$MgSO_4.3Na_2SO_4 + K_3Na(SO_4)_2 + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O$	69.0	53.0	17.0	35.0	
R	$MgSO_4.Na_2SO_4.\frac{5}{2}H_2O + K_3Na(SO_4)_2 + 2MgSO_4.K_2SO_4$	60.0	49.0	24.0	33.0	
S	$2MgSO_4.K_2SO_4 + K_3Na(SO_4)_2 + KCl$	59.0	67.0	26.0	20.0	
T	$2MgSO_4.K_2SO_4 + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O + MgSO_4.H_2O$	32.0	21.0	84.0	28.0	
U	$2MgSO_4.K_2SO_4 + KCl + MgSO_4.H_2O$	22.0	30.0	152.0	10.0	
V	$MgKCl_3.6H_2O + KCl + MgSO_4.H_2O$	4.0	24.0	173.0	10.0	
W	$MgKCl_3.6H_2O + MgSO_4.H_2O + MgCl_2.6H_2O$	2.0	4.0	232.0	2.0	
°C	At various temperatures (97)					
4.5	$MgSO_4.7H_2O + Na_2SO_4.MgSO_4.4H_2O + K_2SO_4.MgSO_4.6H_2O$	43.7	14.86	51.04	31.06	
12.5	$K_2SO_4.MgSO_4.6H_2O + MgSO_4.KCl.3H_2O + KCl$	7.8	10.8	126.8	16	
61.5	$MgCl_2.6H_2O + MgSO_4.H_2O + MgKCl_3.6H_2O$	1.8	4.0	232.4	2.20	
65	$K_3Na(SO_4)_2 + K_2SO_4.MgSO_4.4H_2O + KCl$	48.2	47.6	42.2	33.0	
69.5	$MgSO_4.KCl.3H_2O + 2MgSO_4.K_2SO_4 + KCl$	24.4	36.4	95.0	19.0	

Invariant points (189)

°C	Solid phases
25.5	$K_3Na(SO_4)_2 + K_2SO_4.MgSO_4.6H_2O + K_2SO_4.MgSO_4.4H_2O + KCl + NaCl$
27	$MgSO_4.6H_2O + MgSO_4.7H_2O + MgSO_4.KCl.3H_2O + K_2SO_4.MgSO_4.4H_2O + NaCl$
27.5	$MgSO_4.6H_2O + MgSO_4.7H_2O + K_2SO_4.MgSO_4.4H_2O + Na_2SO_4.MgSO_4.4H_2O + NaCl$
31.5	$MgSO_4.H_2O + MgSO_4.6H_2O + MgSO_4.KCl.3H_2O + K_2SO_4.MgSO_4.4H_2O + NaCl$
32	$MgSO_4.H_2O + MgSO_4.6H_2O + MgSO_4.K_2SO_4.4H_2O + Na_2SO_4.MgSO_4.4H_2O + NaCl$
37.5	$MgSO_4.H_2O + Na_2SO_4.MgSO_4.4H_2O + K_2SO_4.MgSO_4.4H_2O + 2MgSO_4.K_2SO_4 + NaCl$
46	$Na_2SO_4 + K_3Na(SO_4)_2 + MgSO_4.3Na_2SO_4 + Na_2SO_4.MgSO_4.4H_2O + NaCl$
47	$K_2SO_4.MgSO_4.4H_2O + Na_2SO_4.MgSO_4.4H_2O + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O + 2MgSO_4.K_2SO_4 + NaCl$
55	$MgSO_4.KCl.3H_2O + 2MgSO_4.K_2SO_4 + K_2SO_4.MgSO_4.4H_2O + KCl + NaCl$
59.5	$MgSO_4.Na_2SO_4.\frac{5}{2}H_2O + Na_2SO_4.MgSO_4.4H_2O + MgSO_4.3Na_2SO_4 + K_3Na(SO_4)_2 + NaCl$
60.5	$2MgSO_4.K_2SO_4 + K_2SO_4.MgSO_4.4H_2O + K_3Na(SO_4)_2 + KCl + NaCl$
72	$MgSO_4.H_2O + MgKCl_3.6H_2O + KCl + MgSO_4.KCl.3H_2O + NaCl$

Parentheses around the first of the solids listed in the systems tabulated below indicate that this solid will disappear if the temperature is increased above the value given for the system. Parentheses around the last of the solids listed indicate that this solid will disappear if the temperature is decreased. The table gives all the data needed for the construction of the paragenesis diagrams of van't Hoff (189).

The author (220) shows how the data obtained by van't Hoff and his coworkers can be represented graphically by the use of a prism with a triangular base, when recalculated to give the molal percentages of the dissolved salts.

It was then possible to calculate by graphical interpolation the transition points given below.

°C	Solid phases—NaCl and the following:	Liquid phase—M per 1000M H_2O				
		Mg	K_2	Na_2	SO_4	Cl_2
100	(Loeweite), Vanthoffite, Kieserite, Langbeinite	49.0	12.3	20.0	15.4	65.9
90	Loeweite, Langbeinite, Glaserite, Vanthoffite	21.5	29.0	32.5	16.0	70.0
83	(Kainite), Langbeinite, Kieserite, Sylvite	80.5	14.5	11.0	5.0	101.0
72	(Kainite), Langbeinite, Kieserite, Carnallite	87.6	9.5	3.5	4.3	96.3
61.5	(Leonite), Loeweite, Glaserite, Langbeinite	33.2	15.4	36.4	21.3	63.7

$Cl^- \; SO_4^{--} \; Mg^{++} \; Na^+ \; K^+$.—(*Continued*)

°C	Solid phases—NaCl and the following:	Liquid phase—M per 1000M H_2O				
		Mg	K_2	Na_2	SO_4	Cl_2
60.5	(Leonite), Sylvite, Glaserite, Langbeinite	38.7	23.0	61.7	16.4	107.0
59.5	(Astrakanite), Vanthoffite, Loeweite	28.7	0.0	?	14.8	?
59.5	(Astrakanite), Vanthoffite, Glaserite, Loeweite	28.0	16.2	48.0	23.3	68.9
56.5	Astrakanite, Glaserite, Leonite, Loeweite	32.7	15.0	34.8	22.0	60.5
55	Leonite, Kainite, Sylvite, (Langbeinite)	46.0	19.7	16.4	16.4	65.7
49	Astrakanite, Kieserite, (Loeweite)	71.5	0.0	64.0	14.0	111.5
49	Thenardite, Astrakanite, (Vanthoffite)	15.0	0.0	47.0	12.8	49.2
47	Astrakanite, Loeweite, Leonite, Langbeinite	58.4	8.9	15.8	16.1	67.0
46	Astrakanite, Thenardite, Glaserite, (Vanthoffite)	9.8	10.9	50.0	15.0	55.7
43	Astrakanite, Kieserite, Langbeinite, (Loeweite)	72.6	6.1	11.5	13.0	77.2
37.5	Kieserite, Langbeinite, Leonite, Astrakanite	71.4	6.1	11.0	14.2	74.3
37	Leonite, Kieserite, Kainite, (Langbeinite)	74.8	5.6	9.3	13.0	76.7
35.5	(Hexahydrite), Kieserite, Astrakanite	71.7	15.2	8.8	15.2	65.3
32	(Hexahydrite), Astrakanite, Leonite, Kieserite	69.8	5.9	10.5	15.5	70.7
31.5	Hexahydrite, Kieserite, Kainite, Leonite	73.0	5.6	10.8	14.4	75.0
31	(Reichardite), Hexahydrite, Astrakanite	68.8		8.5	16.7	60.7
27.2	(Reichardite), Astrakanite, Leonite, Hexahydrite	67.5	6.1	10.5	17.2	66.9
27	Reichardite, Hexahydrite, Kainite, Leonite	69.7	5.5	9.2	16.5	67.9
26	(Schoenite), Glaserite, Astrakanite, Leonite	34.0	13.8	24.0	15.1	56.7
25.5	(Schoenite), Glaserite, Sylvite, Leonite	34.8	11.0	28.4	18.7	55.5
23.5	Schoenite, Reichardite, Astrakanite, Leonite	58.8	8.0	24.0	19.4	72.4
23	Hexahydrite, Kainite, Carnallite, Kieserite	92.1	1.4	2.0	7.6	86.1
20	Schoenite, Kainite, Sylvite, (Leonite)	61.5	7.9	8.3	13.2	64.5
18	Schoenite, Kainite, Reichardite, (Leonite)	64.2	6.5	7.8	15.5	63.0
18	Reichardite, Kainite, Carnallite, (Hexahydrite)	83.8	1.9	1.4	7.0	80.1
18	Hexahydrite, Bischoffite, (Kieserite)?	100.5	0.0	0.4	4.5	96.4
17.5	Hexahydrite, Bischoffite, Carnallite, (Kieserite)	105.0	0.6	0.5	5.2	103.9
16.3	Mirabilite, Glaserite, (Thenardite)	0.0	6.9	45.0	16.1	35.8
15.3	Mirabilite, Astrakanite, (Thenardite)	21.2	0.0	57.0	19.6	58.6
13.5	Mirabilite, Glaserite, Astrakanite, (Thenardite)	21.1	5.6	52.8	27.9	51.6
13	Reichardite, Bischoffite, (Hexahydrite)	101.0		0.4	4.2	97.2
12.5	Reichardite, Bischoffite, Carnallite, (Hexahydrite)	105.0	0.4	0.5	5.4	101.5
12.5	Schoenite, Reichardite, Sylvite, (Kainite)	64.1	6.6	9.1	12.1	60.5
12	Sylvite, Reichardite, Carnallite, (Kainite)	74.3	3.1	2.5	5.9	74.5
7	Mirabilite, Schoenite, Astrakanite, Glaserite	33.2	8.7	23.4	20.3	45.8
5	Mirabilite, Reichardite, (Astrakanite)	34.0	0.0	21.5	13.5	42.0
4.5	Mirabilite, Reichardite, Schoenite, (Astrakanite)	38.5	9.8	25.7	19.3	54.7
4.4	Mirabilite, Sylvite, (Glaserite)		14.6	47.0	5.2	56.4
3	Mirabilite, Schoenite, Sylvite, (Glaserite)	33.0	10.0	25.5	11.0	57.5

The solid phases whose mineralogical names are used in the preceding table have the following compositions:

Astrakanite, $MgSO_4.Na_2SO_4.4H_2O$
Bischoffite, $MgCl_2.6H_2O$
Carnallite, $MgCl_2.KCl.6H_2O$
Glaserite, approx. $K_3Na(SO_4)_2$
Hexahydrite, $MgSO_4.6H_2O$
Kainite, $MgSO_4.KCl.3H_2O$
Kieserite, $MgSO_4.H_2O$
Langbeinite, $2MgSO_4.K_2SO_4$
Leonite, $MgSO_4.K_2SO_4.4H_2O$
Loeweite, $MgSO_4.Na_2SO_4.\frac{5}{2}H_2O$
Mirabilite, $Na_2SO_4.10H_2O$
Reichardite, $MgSO_4.7H_2O$
Schoenite, $MgSO_4.K_2SO_4.6H_2O$
Sylvite, KCl
Thenardite, Na_2SO_4
Vanthoffite, $MgSO_4.3Na_2SO_4$

$Cl^- \; SO_4^{--} \; Mg^{++} \; K^+$ (97, 200, 231, 248)

$H_2O + MgCl_2 + K_2SO_4$; *v.* Figs. 22, 23, 24, 25

	Solid phases	Liquid phase—M per 1000M H_2O			
		KCl	$0.5MgCl_2$	$0.5MgSO_4$	$0.5K_2SO_4$
	$t = 0°C$; *v.* Fig. 22				
A	$MgSO_4.7H_2O$			80.4	
B	$MgSO_4.7H_2O + MgCl_2.6H_2O$		195.4	6.8	
C	$MgCl_2.6H_2O$		199.6		
D	$MgCl_2.6H_2O + MgKCl_3.6H_2O$	(0.6)	(198)		
E	$MgKCl_3.6H_2O + KCl$	7.30	134.2		
F	KCl	68.1			
G	$KCl + K_2SO_4$	67.3			2.50
H	K_2SO_4				14.94
I	$K_2SO_4 + K_2SO_4.MgSO_4.6H_2O$			32.0	18.8
J	$K_2SO_4.MgSO_4.6H_2O + MgSO_4.7H_2O$			(83)	(10)

$Cl^- \; SO_4^{--} \; Mg^{++} \; K^+$.—(*Continued*)

	Solid phases	Liquid phase—M per 1000M H_2O			
		KCl	$0.5MgCl_2$	$0.5MgSO_4$	$0.5K_2SO_4$
	t = 0°C.—(*Continued*)				
P	$K_2SO_4 + KCl + K_2SO_4.MgSO_4.6H_2O$	39.6	37.6	10.0	
Q	$KCl + K_2SO_4.MgSO_4.6H_2O + MgSO_4.7H_2O$	16.2	85.6	17.0	
R	$MgSO_4.7H_2O + MgKCl_3.6H_2O + KCl$	8.4	134.0	8.8	
S	$MgSO_4.7H_2O + MgKCl_3.6H_2O + MgCl_2.6H_2O$				
	t = 25°C; *v.* Fig. 23				
A	$MgSO_4.7H_2O$			109	
B	$MgSO_4.7H_2O + MgSO_4.6H_2O$		145.4	30.4	
C	$MgSO_4.6H_2O + MgSO_4.H_2O$		177?	15?	
D	$MgSO_4.H_2O + MgCl_2.6H_2O$		202?	11?	
E	$MgCl_2.6H_2O$		208.0		
F	$MgCl_2.6H_2O + MgKCl_3.6H_2O$	2.0	207.0		
G	$MgKCl_3.6H_2O + KCl$	11.0	142.0		
H	KCl	89.3			
I	$KCl + K_2SO_4$	84.6			3.14
J	K_2SO_4				24.9
K	$K_2SO_4 + MgSO_4.K_2SO_4.6H_2O$			44.0	31.6
L	$MgSO_4.K_2SO_4.6H_2O + MgSO_4.7H_2O$			116.6	10.8
P	$K_2SO_4 + KCl + MgSO_4.K_2SO_4.4H_2O$	50.0	42.0	22.0	
Q	$KCl + MgSO_4.K_2SO_4.6H_2O + MgSO_4.KCl.3H_2O + MgSO_4.K_2SO_4.4H_2O$	21.2	104.2	29.2	
R	$MgSO_4.K_2SO_4.4H_2O + MgSO_4.7H_2O + MgSO_4.K_2SO_4.6H_2O$				
S	$MgSO_4.K_2SO_4.4H_2O + MgSO_4.7H_2O + MgSO_4.KCl.3H_2O$		(130)		
T	$MgSO_4.KCl.3H_2O + MgKCl_3.6H_2O + KCl$	12.8	135	27.8	
U	$MgSO_4.6H_2O + MgSO_4.7H_2O + MgSO_4.KCl.3H_2O$				
V	$MgSO_4.6H_2O + MgSO_4.KCl.3H_2O + MgKCl_3.6H_2O$		(170)		
X	$MgSO_4.H_2O + MgKCl_3.6H_2O + MgCl_2.6H_2O$		(200)		
	t = 55°C; *v.* Fig. 24				
A	$MgSO_4.6H_2O$			157	
B	$MgSO_4.6H_2O + MgSO_4.H_2O$		(40)	(128)	
C	$MgSO_4.H_2O + MgCl_2.6H_2O$		(225)	(2)	
D	$MgCl_2.6H_2O$		227.2		
E	$MgCl_2.6H_2O + KMgCl_3.6H_2O$	2.4	222.0		
F	$KMgCl_3.6H_2O + KCl$	11.4	162.0		
G	KCl	106.3			
H	$KCl + K_2SO_4$	102.8			3.9
I	K_2SO_4				35.8
J	$K_2SO_4 + MgSO_4.K_2SO_4.4H_2O$			86.2	47.4
K	$MgSO_4.K_2SO_4.4H_2O + MgSO_4.6H_2O$			(159)	(15)
P	$K_2SO_4 + KCl + MgSO_4.K_2SO_4.4H_2O$	66.6	42.4	22.8	
Q	$KCl + MgSO_4.K_2SO_4.4H_2O + KCl.MgSO_4.3H_2O$	57.4	63.2	26.4	
R	$MgSO_4.K_2SO_4.4H_2O + 2MgSO_4.K_2SO_4 + KCl.MgSO_4.3H_2O$	30.8	82.8	26.0	
S	$MgSO_4.6H_2O + MgSO_4.H_2O + MgSO_4.K_2SO_4.4H_2O$		(?)	(?)	
T	$MgSO_4.K_2SO_4.4H_2O + 2MgSO_4.K_2SO_4 + MgSO_4.H_2O$	13.8	65.0	92.2	
U	$2MgSO_4.K_2SO_4 + MgSO_4.KCl.3H_2O + MgSO_4.H_2O$	7.2	101.8	66.2	
V	$MgSO_4.H_2O + MgSO_4.KCl.3H_2O + MgKCl_3.6H_2O$		(178)		
W	$KCl + MgKCl_3.6H_2O + MgSO_4.KCl.3H_2O$	12.4	160.6	8.6	
X	$MgSO_4.H_2O + MgCl_2.6H_2O + MgKCl_3.6H_2O$		(218)		
	t = 85°C; *v.* Fig. 25				
A	$MgSO_4.H_2O$			201	
B	$MgSO_4.H_2O + MgCl_2.6H_2O$		(?)	(?)	
C	$MgCl_2.6H_2O$		257.0		
D	$MgCl_2.6H_2O + MgKCl_3.6H_2O$	2.8	246.0		
E	$MgKCl_3.6H_2O + KCl$	12.0	183.0		
F	KCl	127.0			
G	$KCl + K_2SO_4$	122.2			4.8
H	K_2SO_4				45.6
I	$K_2SO_4 + 2MgSO_4.K_2SO_4$			(82)	(54)
J	$2MgSO_4.K_2SO_4 + MgSO_4.H_2O$			(180)	(8)
P	$K_2SO_4 + 2MgSO_4.K_2SO_4 + KCl$	88.4	36.3	26.8	
Q	$KCl + 2MgSO_4.K_2SO_4 + MgSO_4.H_2O$	29.2	175.8	11.8	
R	$MgSO_4.H_2O + KCl + MgKCl_3.6H_2O$		(190)		
S	$MgSO_4.H_2O + MgCl_2.6H_2O + MgKCl_3.6H_2O$	(?)	(?)	(?)	

$Cl^- \; SO_4^{--} \; Mg^{++} \; K^+$.—(*Continued*)

°C	Invariant points (determined by approximate graphical methods)
13	$MgSO_4.7H_2O + MgSO_4.KCl.3H_2O + MgKCl_3.6H_2O + KCl$
14	$MgSO_4.7H_2O + MgSO_4.KCl.3H_2O + MgSO_4.K_2SO_4.6H_2O + KCl$
18	$MgSO_4.7H_2O + MgSO_4.KCl.3H_2O + MgKCl_3.6H_2O + MgSO_4.6H_2O$
20	$MgSO_4.K_2SO_4.6H_2O + MgSO_4.K_2SO_4.4H_2O + MgSO_4.KCl.3H_2O + MgSO_4.7H_2O$
25	$MgSO_4.K_2SO_4.6H_2O + MgSO_4.K_2SO_4.4H_2O + MgSO_4.KCl.3H_2O + KCl$
25	$MgSO_4.KCl.3H_2O + MgKCl_3.6H_2O + MgSO_4.H_2O + MgSO_4.6H_2O$
26	$MgSO_4.K_2SO_4.4H_2O + MgSO_4.KCl.3H_2O + MgSO_4.7H_2O + MgSO_4.6H_2O$
35	$MgSO_4.K_2SO_4.6H_2O + MgSO_4.K_2SO_4.4H_2O + K_2SO_4 + KCl$
63	$MgSO_4.K_2SO_4.4H_2O + MgSO_4.KCl.3H_2O + 2MgSO_4.K_2SO_4 + KCl$
65	$MgSO_4.K_2SO_4.4H_2O + 2MgSO_4.K_2SO_4 + K_2SO_4 + KCl$
76	$MgSO_4.KCl.3H_2O + MgKCl_3.6H_2O + MgSO_4.H_2O + KCl$
85	$MgSO_4.KCl.3H_2O + 2MgSO_4.K_2SO_4 + MgSO_4.H_2O + KCl$

$Cl^- \; SO_4^{--} \; Ca^{++}$ (18, 250)

$H_2O + HCl + CaSO_4$

t = 25°C (18)

g $CaSO_4$/l	g HCl/l
$CaSO_4.2H_2O$	
2.062	0
4.375	3.646
9.935	18.230
13.565	36.46
17.275	72.92

t = 25°C (250)

% HCl*	g $CaSO_4$†
(?)‡	
0.77	6.405
1.56	8.821
3.06	12.639
4.70	15.342
6.12	16.539
t = 101°C	
0.77	11.209
t = 102°C	
3.06	31.780
t = 103°C	
6.12	46.902

* Before saturation.

† Per l of saturated solution.

‡ Composition of solid phase not determined.

$Cl^- \; SO_4^{--} \; Ca^{++}$

$H_2O + H_2SO_4 + CaCl_2$

t = 25°C (94)

M per 1000M H_2O*

HCl	$CaSO_4$
$CaSO_4.2H_2O$	
1.80	0.580
3.86	0.857
7.90	1.187
9.12	1.341
15.81	1.724
18.49	1.856
24.74	2.114
32.79	2.303
37.83	2.418

* Based on data from (18, 250).

$Cl^- \; SO_4^{--} \; Ca^{++}$ (68, 250, 381)

$H_2O + CaCl_2 + CaSO_4$

t = 25°C (68)

g $CaCl_2$/l	g $CaSO_4$/l
$CaSO_4.2H_2O$ (?)	
0.0	2.056
7.489	1.244
11.959	1.181
25.770	1.096
32.045	1.080
51.531	1.016
97.023	0.841
192.705	0.465
280.303	0.203
367.850	0.032

(250)*

t, °C	% $CaCl_2$	g $CaSO_4$/100cm³ soln.
23	3.54	0.1225
24	6.94	0.0963
25	10.35	0.0886
25	15.90	0.0734
25	16.91	0.0702
101	3.54	0.1370
102	10.36	0.1426
103	16.91	0.1301

(381)*

t, °C	g $CaCl_2$/100g H_2O	g $CaSO_4$/100g H_2O
15	15.0	0.063
21	14.7	0.086
39	15.0	0.091
72	14.9	0.100
94	15.2	0.110
138	14.7	0.070
170	14.82	0.031
195	14.70	0.022

* Composition of solid phase not determined.

$Cl^- \; SO_4^{--} \; Ca^{++} \; Na^+$ (53, 54, 94)

$H_2O + CaCl_2 + Na_2SO_4$

t = 23°C (53)

g $CaSO_4$/l	g NaCl/l
$CaSO_4.2H_2O$	
2.37	0.99
3.02	4.95
3.54	10.40
4.97	30.19
5.94	49.17

$Cl^- \; SO_4^{--} \; Ca^{++} \; Na^+$.—(*Cont'd*)

g $CaSO_4$/l	g NaCl/l
$CaSO_4.2H_2O$	
6.74	75.58
7.50	129.50
7.25	197.20
7.03	229.70
5.68	306.40
$CaSO_4.2H_2O$ + NaCl	
5.37	315.55

Solid phase assumed to be $CaSO_4.2H_2O$ (54)

g NaCl/l	g $CaSO_4$/l
t = 15°C	
0.6	2.3
1.1	2.5
5.1	3.1
10.6	3.7
31.1	4.8
51.4	5.6
139.9	7.4
t = 23°C	
0.99	2.37
4.95	3.02
10.40	3.54
30.19	4.97
49.17	5.94
75.58	6.74
129.50	7.50
197.20	7.25
229.70	7.03
306.40	5.68
315.55	5.37
t = 26°C	
0	2.121
91.154	6.656
143.989	7.179
148.343	7.164
176.502	7.119
228.756	6.794
274.173	6.498
320.491	5.715
t = 30°C	
0.5	2.5
10.3	3.6
30.3	5.0
47.3	6.1
73.4	6.9
126.9	7.3
192.4	7.7

$Cl^- \; SO_4^{--} \; Ca^{++} \; Na^+$.—(*Cont'd*)

g NaCl/l	g $CaSO_4$/l
Solid phase assumed to be $CaSO_4.2H_2O$	
t = 52°C	
0.5	2.3
1.1	2.4
5.0	2.9
10.10	3.5
29.60	5.0
48.30	5.8
75.70	6.6
131.60	7.1
195.60	7.4
t = 70°C	
0.5	2.2
10.0	3.4
29.6	4.9
48.8	5.8
132.7	7.4
195.0	7.6
t = 82°C	
0	2.07
1.0	2.18
5.0	2.65
10.1	3.30
29.5	4.68
48.8	5.54
74.9	6.23
128.7	7.00
195.10	7.51

t = 25°C* (94)

M per 1000M H_2O

NaCl	$CaSO_4$
$CaSO_4.2H_2O$	
29.04	0.93
46.83	1.02
48.31	1.02
58.09	1.03
77.14	1.99
90.39	0.95
112.50	0.84

* By interpolation from Cameron (53, 54) from data at 23 and 26°C.

Cl^- SO_4^{--} Ca^{++} Na^+

$H_2O + CaSO_4 + NaCl + Na_2SO_4$: $t = 25°C$ (59)

% NaCl	% Na_2SO_4	% $CaSO_4$
$Na_2SO_4.10H_2O + CaSO_4.2H_2O$		
0	21.14	0.219
2.28	19.65	0.180
4.58	18.06	0.157
7.64	16.16	0.135
$Na_2SO_4.10H_2O + Na_2SO_4 + 2CaSO_4.3Na_2SO_4$		
13.63	15.44	0.025
$Na_2SO_4 + 2CaSO_4.3Na_2SO_4$		
16.42	12.15	0.022
18.88	9.58	0.023
$Na_2SO_4 + NaCl + 2CaSO_4.3Na_2SO_4$		
22.71	6.70	0.022
$NaCl + CaSO_4.2H_2O$		
25.85		0.467
$CaSO_4.2H_2O + 2CaSO_4.3Na_2SO_4$		
11.71	14.34	
12.84	13.42	
14.93	10.96	
17.36	8.98	
22.27	5.69	
23.78	3.89	

Cl^- SO_4^{--} Ca^{++} Na^+ K^+

$H_2O + CaCl_2 + Na_2SO_4 + K_2SO_4$: $t = 25°$ (94)

M per 1000M H_2O

NaCl	K_2SO_4	$CaSO_4$
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$		
3.01	3.55	0.244
7.75	4.01	0.272
16.36	4.58	0.315
38.90	5.76	0.361
67.40	6.56	0.288
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O + NaCl$		
111.70	7.03	0.186

Cl^- SO_4^{--} Ca^{++} K^+

$H_2O + CaCl_2 + K_2SO_4$

$t = 25°C$ (94); *cf.* (104)

M per 1000M H_2O

K_2SO_4	$CaSO_4$	KCl	$CaCl_2$
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$			
3.05	0.232	0.506	
1.60	0.327	6.01	
	0.706	22.67	0.655
	0.230	73.12	9.26

Cl^- SO_4^{--} Ca^{++} K^+

$H_2O + H_2SO_4 + CaCl_2 + K_2SO_4$: $t = 25°C$ (94)

M per 1000M H_2O

HCl	K_2SO_4	$CaSO_4$
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$		
6.55	5.308	0.395
33.80	10.94	0.793

Cl^- SO_4^{--} Sr^{++}

$H_2O + HCl + SrSO_4$

$t = 25°C$ (18)

M_{HCl}/l	g $SrSO_4$/l
$SrSO_4$	
0.1	0.48
0.5	1.26
1.0	1.88
2.0	2.07
5.0	1.61

Cl^- SO_4^{--} Ba^{++}

$H_2O + H_2SO_4 + BaCl_2$

$t = 25°C$ (18)

M_{HCl}/l	g $BaSO_4$/l
$BaSO_4$	
0.5	0.666
1.0	0.892
2.0	0.101
5.0	0.086

Cl^- SO_4^{--} Li^+

$H_2O + LiCl + Li_2SO_4$

$t = 30°C$ (357)

% LiCl	% Li_2SO_4
$Li_2SO_4.H_2O$	
0.0	25.25
0.96	23.60
2.76	20.43
5.12	17.11
7.92	12.94
12.09	7.58
14.49	5.27
15.30	4.48
21.04	1.08
30.74	0.0
$Li_2SO_4.H_2O + LiCl.H_2O$	
45.97	0.0
$LiCl.H_2O$	
46.10	0.0

Cl^- SO_4^{--} Na^+: $H_2O + NaCl + Na_2SO_4$ (35, 240, 257, 269, 311, 345, 375)

Solid phases	Liquid phase									
	$t = 0°C$		$t = 4.4°C$		$t = 15°C$		$t = 16.3°C$		$t = 25°C$	
	% NaCl	% Na_2SO_4	% NaCl	% Na_2SO_4	% NaCl	% Na_2SO_4	% NaCl	% Na_2SO_4	% NaCl	% Na_2SO_4
NaCl	26.26				26.35				26.42	
$NaCl + Na_2SO_4.10H_2O$	25.54	1.30	22.48	5.40	23.42	5.63	22.34	7.47	13.53	15.42
$NaCl + Na_2SO_4$									22.71	8.06
$Na_2SO_4.10H_2O$	10.70	1.50		5.93		11.63		13.04	9.74	15.65
		4.65							4.21	18.25
										21.79

Solid phases	Liquid phase							
	$t = 35°C$		$t = 40°C$		$t = 50°C$		$t = 60°C$	
	% NaCl	% Na_2SO_4	% NaCl	% Na_2SO_4	% NaCl	% Na_2SO_4	% NaCl	% Na_2SO_4
NaCl	26.58		26.70		26.74		27.0	
$NaCl + Na_2SO_4$	23.46	6.14	23.60	6.1	23.89	5.20	24.6	5.2
Na_2SO_4		33.07		32.5		30.95		31.2
	$t = 75°C$		$t = 80°C$		$t = 100°C$		$t = 105°C$	
	% NaCl	% Na_2SO_4	% NaCl	% Na_2SO_4	% NaCl	% Na_2SO_4	% NaCl	% Na_2SO_4
NaCl	27.41		27.5		28.26		28.28	
$NaCl + Na_2SO_4$	24.94	4.69	25.30	5.0	25.57	4.48	26.14	4.41
Na_2SO_4		30.27		30.4		29.42		29.49

Cl^- SO_4^{--} Na^+.—(*Continued*)

Invariant points
$NaCl.2H_2O + NaCl + Na_2SO_4.10H_2O$ at $-2.85°C$
$NaCl + Na_2SO_4.10H_2O + Na_2SO_4$ at 17.9°C: NaCl, 22.43 %; Na_2SO_4, 7.64%

$t = 25°C$ (59)

% NaCl	% Na_2SO_4
$Na_2SO_4.10H_2O$	
0	22.11
2.27	20.44
4.42	18.59
6.35	16.23
9.94	14.55
11.61	14.42

$t = 25°C$.—(*Continued*)

% NaCl	% Na_2SO_4
$Na_2SO_4.10H_2O + Na_2SO_4$	
13.60	14.76
Na_2SO_4	
16.57	11.62
19.15	9.11
21.92	7.04
22.66	6.94

$t = 25°C$.—(*Continued*)

% NaCl	% Na_2SO_4
$Na_2SO_4 + NaCl$	
22.96	6.86
NaCl	
23.92	4.72
24.91	2.44
26.26	0.0

Cl^- SO_4^{--} Na^+ K^+

$H_2O + Na_2SO_4 + KCl$ (35, 97, 269)

v. Figs. 26, 27, 28

	Solid phases	Liquid phase—M per 1000M H_2O			
		NaCl	KCl	0.5Na_2SO_4	0.5K_2SO_4
	t = 0°C (35); *v.* Fig. 26				
A	$Na_2SO_4.10H_2O$			11.70	
B	$Na_2SO_4.10H_2O + NaCl$	106.6		4.64	
C	$NaCl$	107.7			
D	$NaCl + KCl$	97.19	25.50		
E	KCl		68.10		
F	$KCl + K_2SO_4$		67.32		2.50
G	K_2SO_4				14.94
H	$K_2SO_4 + Na_2SO_4.10H_2O$			16.00	18.60
P	$Na_2SO_4.10H_2O + K_2SO_4 + K_3Na(SO_4)_2$	23.00	32.00	12.00	
Q	$K_2SO_4 + KCl + K_3Na(SO_4)_2$	38.8	43.0	5.74	
R	$KCl + K_3Na(SO_4)_2 + Na_2SO_4.10H_2O$	83.4	24.3		6.70
S	$KCl + NaCl + Na_2SO_4.10H_2O$	98.9	18.9		7.50
	t = 0°C (97)				
R	$KCl + K_3Na(SO_4)_2 + Na_2SO_4.10H_2O$	87.4	28.4		7.00
S	$KCl + NaCl + Na_2SO_4.10H_2O$	95.0	26.4		6.80
	t = 0°C (269)				
	$K_2SO_4 + K_3Na(SO_4)_2$		15.0		20.00
	$Na_2SO_4.10H_2O + K_3Na(SO_4)_2$		20.0		20.00
	t = 25°C (35); *v.* Fig. 27				
A	$Na_2SO_4.10H_2O$			70.8	
B	$Na_2SO_4.10H_2O + Na_2SO_4$	58.1		55.0	
C	$Na_2SO_4 + NaCl$	99.1		24.9	
D	$NaCl$	109.8			
E	$NaCl + KCl$	92.1	39.3		
F	KCl		89.3		
G	$KCl + K_2SO_4$		88.2		3.0
H	K_2SO_4				24.9
I	$K_2SO_4 + K_3Na(SO_4)_2$			16.96	27.4
J	$Na_2SO_4.10H_2O + K_3Na(SO_4)_2$			78.5	19.3
P	$K_2SO_4 + KCl + K_3Na(SO_4)_2$	20.9	71.0		4.6
Q	$KCl + NaCl + K_3Na(SO_4)_2$	86.2	39.6	8.9	
R	$NaCl + Na_2SO_4 + K_3Na(SO_4)_2$	107.5		5.7	22.8
S	$Na_2SO_4.10H_2O + Na_2SO_4 + K_3Na(SO_4)_2$	43.8		56.5	15.1
	t = 50°C (35)				
	Na_2SO_4			113.7	
	$Na_2SO_4 + NaCl$	103.9		18.5	
	$NaCl$	112.5			
	$NaCl + KCl$	89.6	53.2		
	KCl		104.2		
	$KCl + K_2SO_4$		102.0		3.8
	K_2SO_4				35.2
	$K_2SO_4 + K_3Na(SO_4)_2$			17.2	35.9
	$Na_2SO_4 + K_3Na(SO_4)_2$			116.0	19.4
	$K_2SO_4 + KCl + K_3Na(SO_4)_2$	14.4	84.7		5.3
	$KCl + NaCl + K_3Na(SO_4)_2$	82.7	54.0	8.0	
	$NaCl + Na_2SO_4 + K_3Na(SO_4)_2$	80.3	29.2		23.50
	t = 55°C (97)				
	$NaCl + Na_2SO_4 + K_3Na(SO_4)_2$	89.8	29.8	23.4	
	$NaCl + KCl + K_3Na(SO_4)_2$	83.2	58.6	8.0	
	t = 75°C (35)				
	Na_2SO_4			110.1	
	$Na_2SO_4 + NaCl$	109.3		16.96	
	$NaCl$	116.3			
	$NaCl + KCl$	85.9	70.2		
	KCl		120.0		
	$KCl + K_2SO_4$		117.8		4.4
	K_2SO_4				43.0
	$K_2SO_4 + K_3Na(SO_4)_2$			25.6	38.46
	$Na_2SO_4 + K_3Na(SO_4)_2$			106.7	24.34

$Cl^- \; SO_4^{--} \; Na^+ \; K^+$.—(*Continued*)

	Solid phases	Liquid phase—M per 1000M H_2O NaCl	KCl	$0.5Na_2SO_4$	$0.5K_2SO_4$
	t = 75°C.—(*Continued*)				
	$K_2SO_4 + KCl + K_3Na(SO_4)_2$	17.6	102.9		5.86
	$KCl + NaCl + K_3Na(SO_4)_2$	78.46	71.0	8.46	
	$NaCl + Na_2SO_4 + K_3Na(SO_4)_2$	87.1	38.0	22.5	
	t = 83°C (204)				
	$NaCl + Na_2SO_4 + K_3Na(SO_4)_2$	87.2	42.4	22.5	
	$KCl + NaCl + K_3Na(SO_4)_2$	78.8	77.6	8.8	
	t = 100°C (35); *v.* Fig. 28				
A	Na_2SO_4			105.7	
B	$Na_2SO_4 + NaCl$	112.7		16.24	
C	$NaCl$	121.6			
D	$NaCl + KCl$	84.4	85.0		
E	KCl		135.8		
F	$KCl + K_2SO_4$		131.5		5.86
G	K_2SO_4				48.1
H	$K_2SO_4 + K_3Na(SO_4)_2$			34.4	42.4
I	$Na_2SO_4 + K_3Na(SO_4)_2$			105.8	28.2
P	$K_2SO_4 + KCl + K_3Na(SO_4)_2$	9.82	120.8		6.48
Q	$KCl + NaCl + K_3Na(SO_4)_2$	78.5	87.3	9.56	
R	$NaCl + Na_2SO_4 + K_3Na(SO_4)_2$	110.4	24.6		22.7
°C	Invariant points (269)				
4.4	$NaCl + KCl + Na_2SO_4.10H_2O + K_3Na(SO_4)_2$	92.8	28.8	10.84	
16.3	$NaCl + Na_2SO_4 + Na_2SO_4.10H_2O + K_3Na(SO_4)_2$	89.6	18.4	32.60	

$Cl^- \; SO_4^{--} \; K^+$ (35, 269): $H_2O + KCl + K_2SO_4$

Solid phases	Liquid phase *t* = 0°C % KCl	% K_2SO_4	*t* = 4.4°C % KCl	% K_2SO_4	*t* = 16.3°C % KCl	% K_2SO_4	*t* = 25°C % KCl	% K_2SO_4	*t* = 50°C % KCl	% K_2SO_4	*t* = 75°C % KCl	% K_2SO_4	*t* = 100°C % KCl	% K_2SO_4
KCl	21.99		23.22		25.35		26.99		30.12		33.21		35.98	
$KCl + K_2SO_4$	21.59	0.94	22.55	0.74	24.15	1.08	26.51	1.18	29.32	1.28	32.31	1.45	34.61	1.80
K_2SO_4		6.74		8.42		9.22		10.73		14.59		17.22		18.98

$H_2O + KCl + K_2SO_4$ (303)

°C	% KCl	% K_2SO_4	°C	% KCl	% K_2SO_4
		$KCl + K_2SO_4$			
10	23.4	1.0	60	30.1	1.33
20	24.8	1.06	70	31.3	1.39
30	26.2	1.14	80	32.5	1.47
40	27.6	1.20	90	33.7	1.54
50	28.9	1.27	100	34.7	1.61

$Cl^- \; HSO_3^- \; C_{10}H_7NH_2^+ \; C_{10}H_7SO_3^-$ (391)

$H_2O + HCl + C_{10}H_7NH_2.C_{10}H_7SO_3H$, α- and β-Naphthylamine naphthalene-α- and β-sulfonates

°C	Liquid phase—g per 100g solvent (0.01 *N* HCl) α, α-salt	α, β-salt	β, β-salt	β, α-salt	Fe, β-salt*
25	0.3125	0.2039	0.0563	0.1735	0.3022
30	0.4131	0.2391	0.0599	0.2078	0.3470
35	0.5007	0.2985	0.0736	0.2533	0.4233
40	0.5991	0.3675	0.0816	0.3150	0.5135
45	0.7340	0.4420	0.1008	0.3985	0.6174
50	0.8356	0.5398	0.1171	0.4954	0.7711
55	0.9733	0.6246	0.1434	0.6044	0.9171
60	1.113	0.6542	0.1656	0.7391	1.056
65	1.305				
70	1.368	0.8493	0.2393	1.141	1.393
80	1.571	1.283	0.3395	1.829	1.985
90	2.028	2.132	0.4667	2.980	2.882
98	2.651	2.951	0.6218	4.790	3.764

* Anhydrous. Composition of this salt given (391) since it is used to identify the β-acid.

$Cl^- \; HSO_3^- \; C_{10}H_7NH_2^+ \; C_{10}H_6(SO_3)_2^{--}$ (391)

$H_2O + HCl + (C_{10}H_7NH_2)_2.C_{10}H_6(SO_3H)_2$, α-Naphthylamine naphthalenedisulfonate

°C	Liquid phase—g per 100g solvent (0.01 *N* HCl) 1, 5-sulfonate	1, 6-sulfonate	2, 6-sulfonate	2, 7-sulfonate
25	0.0605	2.29	0.5170	0.8689
30	0.0694	3.20	0.6082	0.9805
35	0.0853	4.21	0.7178	1.1620
40	0.0972	7.15	0.8943	1.364
45	0.1033	9.59	1.005	1.599
50	0.1253		1.161	1.931
55	0.1563		1.288	2.405
60	0.1638		1.462	3.386
70	0.2212		2.062	10.300
80	0.2902		2.881	35.20
90	0.4010		3.770	87.70
98	0.4635		4.724	

$H_2O + HCl + (C_{10}H_7NH_2)_2.C_{10}H_6(SO_3H)_2$, β-Naphthylamine naphthalenedisulfonate

°C	Liquid phase—g per 100g solvent (0.01*N* HCl) 1, 5-sulfonate	1, 6-sulfonate	2, 6-sulfonate	2, 7-sulfonate
25	0.0727	0.2952	0.0296	0.1327
30	0.0765	0.3898	0.0386	0.1454
35	0.0887	0.4934	0.0412	0.1917
40	0.1107	0.5600	0.0422	0.2160
45	0.1233	0.6789	0.0594	0.2737

Cl^- HSO_3^- $C_{10}H_7NH_2^+$ $C_{10}H_6(SO_3)_2^{--}$.—(*Continued*)

°C	Liquid phase—g per 100g solvent (0.01*N* HCl): 1, 5-sulfonate	1, 6-sulfonate	2, 6-sulfonate	2, 7-sulfonate
50	0.1493	0.8105	0.0614	0.3312
55	0.1701	0.9546	0.0702	0.4241
60	0.1882	1.245	0.0806	0.4684
70	0.2562	1.852	0.1093	0.6791
80	0.3204	2.695	0.1626	0.9735
90	0.4427	4.019	0.2207	1.433
98	0.5887	5.726	0.2943	1.861

Cl^- Te^{++++}

$H_2O + HCl + TeO_2$

t = 18°C (226)*

M_{HCl}/l	M_{TeO_2}/l
TeO_2	
0.10	0.00057
0.22	0.0012
0.46	0.0037
0.92	0.0091
H_2TeO_3	
0.0	0.0006

* The author also determined concentrations of Te^{++++} in solutions made by adding H_2TeO_3 and HCl to water, and showed that H_2TeO_3 is changed to Te^{++++} and H_2O by slight increase in H^+. Assuming $H_2TeO_3 + 4H^+ \rightarrow Te^{++++} + 3H_2O$ he calculated the following constants; $K_1 = (Te^{++++}) \div (H^+)^4 = 300$ with H_2TeO_3 as a solid phase.
$K_2 = (Te^{++++}) \div (H^+)^4 = 0.021$ with TeO_2 as a solid phase.
Assuming H_2TeO_3 is a base he determined the dissociation constant; $K_3 = (Te^{++++}) \times (OH^-)^4 \div (H_2TeO_3) = 1.5 \times 10^{-46}$.

Cl^- NO_3^- $C_2O_4^{--}$ Ca^{++} K^+

$H_2O + HNO_3 + CaCl_2 + K_2C_2O_4$

t = 24°C (172)

g KNO_3/l*	g CaO/l*
CaC_2O_4†	
0	1.1873
0.5055	1.1973
1.011	1.2000
2.022	1.2086
4.044	1.2193
10.110	1.260
20.22	1.321
30.33	1.3686
40.44	1.4366
50.55	1.4946

* HCl = 18.23g/l throughout the liquid phases.

† Authors do not state whether solid phase was hydrated.

Cl^- NO_3^- Tl^+

$H_2O + HNO_3 + TlCl$

t = 25°C (185)

% HNO_3	% TlCl
TlCl	
0.0	0.3967
3.075	0.5830
6.114	0.6644
11.914	0.7607
22.17	0.8735

Cl^- NO_3^- Tl^+ K^+

$H_2O + TlNO_3 + KCl$

t = 25°C (40)

M_{KNO_3}/l	M_{TlCl}/l
TlCl	
0.0	0.01607
0.02001	0.01716
0.0500	0.01826
0.10005	0.01961
0.3002	0.02313
1.005	0.3072

Cl^- NO_3^- Ag^+

$H_2O + AgCl + AgNO_3$

t = 20°C (249)

% AgCl*	% $AgNO_3$*
AgCl	
0.09137	66.67
0.05758	57.11
0.03608	50.00
0.01607	40.00
0.00979	33.33

* Solution also contained small amounts of NaCl.

Cl^- NO_3^- Ca^{++}

$H_2O + CaCl_2 + Ca(NO_3)_2$

t = ? (19)

% $CaCl_2$	% $Ca(NO_3)_2$
$Ca(NO_3)_2.4H_2O$	
4.60	55.00
7.27	52.90
11.05	53.40
10.70	54.40
7.57	65.28
$CaCl_2.4H_2O$	
42.35	17.03
44.70	11.45
45.00	10.81

Cl^- NO_3^- Ca^{++} K^+

$H_2O + CaCl_2 + KNO_3$

t = 30°C (19)*

% KCl	% $Ca(NO_3)_2$
$KCl + KNO_3$	
24.6	16.2
$KNO_3 + Ca(NO_3)_2$ (?)	
18.20	45.80
$Ca(NO_3)_2$ (?) + $Ca(NO_3)_2.4H_2O$	
9.00	73.50
% $CaCl_2$	% KNO_3
$KCl + KNO_3$	
19.6	26.00
$KCl + CaCl_2.4H_2O\alpha$	
50.70	5.20

* A probable diagram for this system based upon extrapolation of the data given above and those given for the four three-component systems is given by the author.

Cl^- NO_3^- Sr^{++}

$H_2O + HNO_3 + SrCl_2$

t = 25°C (161)

M per 1000g H_2O

HNO_3	$0.5SrCl_2$
$SrCl_2.6H_2O$	
0.0	7.034
0.1771	7.028
0.3521	7.034
1.277	7.034

Cl^- NO_3^- Sr^{++}

$H_2O + SrCl_2 + Sr(NO_3)_2$

t = 25°C (161)

% $SrCl_2$	% $Sr(NO_3)_2$
$SrCl_2.6H_2O$	
35.798	0.0
35.500	0.923
34.461	3.769
33.299	6.947
28.983	18.455

Cl^- NO_3^- Sr^{++} Na^+

$H_2O + SrCl_2 + NaNO_3$

t = 25°C (161)

M per 1000g H_2O

$NaNO_3$	$0.5SrCl_2$
$SrCl_2.6H_2O$	
0.0	7.034
0.3621	7.198
0.5010	7.270
3.5530	7.276
6.856	6.844

Cl^- NO_3^- Sr^{++} $\underline{K}^+$

$H_2O + Sr(NO_3)_2 + KCl$

t = 25°C (161)

M per 1000g H_2O

KNO_3	$0.5SrCl_2$
$SrCl_2.6H_2O$	
0.0	7.034
0.09796	7.122
0.4755	7.406

Cl^- NO_3^- Ba^{++}

$H_2O + BaCl_2 + Ba(NO_3)_2$

t = 30°C (88)

% $BaCl_2$	% $Ba(NO_3)_2$
$BaCl_2.2H_2O$	
27.60	0
27.38	1.58
26.91	4.13
26.64	5.37
$BaCl_2.2H_2O + Ba(NO_3)_2$	
26.11*	7.88*
$Ba(NO_3)_2$	
22.70	7.94
16.14	7.92
13.75	8.20
6.06	9.55
0.0	10.33
t = 20°C (126)	
$BaCl_2.2H_2O$	
26.07	1.31
$BaCl_2.2H_2O + Ba(NO_3)_2$	
25.09	6.93
$Ba(NO_3)_2$	
20.81	6.54
12.31	6.72
7.51	7.17

* Mean of several results.

Cl^- NO_3^- Ba^{++} Na^+: $H_2O + BaCl_2 + NaNO_3$; *v.* Fig. 29

	Solid phases	Liquid phase—M per 1000M H_2O: $0.5BaCl_2$	$0.5Ba(NO_3)_2$	NaCl	$NaNO_3$
	t = 30°C (88)				
A	$Ba(NO_3)_2$		15.92		
B	$Ba(NO_3)_2 + BaCl_2.2H_2O$	69.91	16.90		
C	$BaCl_2.2H_2O$	65.90			
		49.10		22.58	
		27.90		54.14	
D	$BaCl_2.2H_2O + NaCl$	9.07		101.75	
E	NaCl			110.80	
				83.26	84.98
F	$NaCl + NaNO_3$			71.40	132.46
	$NaNO_3$			62.56	140.56
G					204.58
H	$NaNO_3 + Ba(NO_3)_2$		5.76		206.12
	$Ba(NO_3)_2$		5.18		67.76
			5.93		37.18
			8.30		17.22
	$Ba(NO_3)_2 + BaCl_2.2H_2O$	37.29	15.09	42.92	
		17.11	15.41	80.70	
P	$Ba(NO_3)_2 + BaCl_2.2H_2O + NaCl$	0.31	17.68	112.37	
	$NaNO_3 + Ba(NO_3)_2$		4.76	36.17	160.00
			4.34	66.78	141.04
Q	$NaNO_3 + Ba(NO_3)_2 + NaCl$		4.19	70.60	131.49
	$NaCl + NaNO_3$		2.82	70.55	131.17
	t = 20°C (126)				
	$Ba(NO_3)_2$		5.92		13.13
			4.14		37.26
			4.68		128.98
	$Ba(NO_3)_2 + NaNO_3$		2.63		184.86
	$NaNO_3$			42.82	142.77
				52.95	132.76

Cl^- NO_3^- Ba^{++} Na^+.—(*Continued*)

Solid phases	Liquid phase—M per 1000M H_2O			
	0.5Ba-Cl_2	0.5Ba-$(NO_3)_2$	NaCl	$NaNO_3$
t = 20°C.—(*Continued*)				
$NaNO_3$ + NaCl			76.06	115.02
NaCl			87.01	73.51
			90.52	62.70
	3.90		106.53	
NaCl + $BaCl_2.2H_2O$	7.26		104.65	
$BaCl_2.2H_2O$	9.66		87.63	
	15.01		76.06	
	23.00		59.17	
	16.92		31.89	
	62.05	24.85		
$BaCl_2.2H_2O$ + $Ba(NO_3)_2$	63.78	14.04		
$Ba(NO_3)_2$	49.51	12.40		
	26.27	11.43		
	15.22	11.57		
$NaNO_3$ + $Ba(NO_3)_2$	4.13		37.47	148.45
NaCl + $Ba(NO_3)_2$	0.32		81.03	84.99
$BaCl_2.2H_2O$ + $Ba(NO_3)_2$	56.89	13.00	9.04	
$Ba(NO_3)_2$ + NaCl + $NaNO_3$		0.32	78.39	112.72
NaCl + $Ba(NO_3)_2$ + $BaCl_2.2H_2O$		14.42	109.08	1.55

Cl^- NO_3^- Ba^{++} Na^+
H_2O + $BaCl_2$ + $NaNO_3$
t = 30°C (86)

Solid phases	Liquid phase—M per 1000M H_2O			
	0.5Ba-Cl_2	0.5Ba-$(NO_3)_2$	NaCl	$NaNO_3$
$Ba(NO_3)_2$		15.88		
$Ba(NO_3)_2$ + $NaNO_3$		4.36	66.84	141.16
		4.76	36.20	156.16
$NaNO_3$				204.90
$NaNO_3$ + NaCl		2.82	70.74	131.20
$BaCl_2.2H_2O$ + $Ba(NO_3)_2$	37.28	15.18	42.92	
	17.21	15.41	80.92	
NaCl + $BaCl_2.2H_2O$ + Ba-$(NO_3)_2$	27.18	20.48	103.16	
NaCl + $Ba(NO_3)_2$ + $NaNO_3$		4.33	70.70	131.52

Cl^- NO_3^- Na^+ (38, 88, 126, 307)
H_2O + NaCl + $NaNO_3$

Solid phases	Liquid phase—* = g per 100g H_2O; † = % NaCl; % $NaNO_3$													
	t = 5°C (307)		*t* = 15.5°C (38)		*t* = 20°C (126)		*t* = 25°C (307)		*t* = 30°C (88)		*t* = 50°C (307)		*t* = 100°C (307)	
	NaCl*	$NaNO_3$*	NaCl†	$NaNO_3$†	NaCl†	$NaNO_3$†	NaCl*	$NaNO_3$*	NaCl†	$NaNO_3$†	NaCl*	$NaNO_3$*	NaCl*	$NaNO_3$*
NaCl	35.74		26.43				36.04		26.47		36.72		39.2	
			20.91	10.52	18.45	18.62	35.07	5.0	16.14	24.17	28.40	43.9		
			17.04	21.52	17.34	21.30	33.90	10.0	13.11	32.02				
							32.87	15.0						
NaCl + $NaNO_3$	27.60	41.70	14.37	28.25	13.80	30.34	23.62	58.01	12.48	33.67	20.50	84.8	19.20	158
$NaNO_3$	19.42	50.10	11.36	31.61	9.56	34.85	15.00	70.69	10.89	35.77		114.1		176
		76.30	5.34	38.34	7.67	37.18	10.00	77.46	4.05	43.39				
			2.93	41.59			5.00	84.67	0	49.16				
			0	45.47				91.86						

Cl^- NO_3^- Na^+ K^+ (307)
H_2O + $NaNO_3$ + KCl; *v.* Fig. 30

	Solid phases	Liquid phase—M per 1000M H_2O															
		t = 5°C				*t* = 25°C				*t* = 50°C				*t* = 100°C			
		NaCl	KCl	$NaNO_3$	KNO_3	NaCl	KCl	$NaNO_3$	KNO_3	NaCl	KCl	$NaNO_3$	KNO_3	NaCl	KCl	$NaNO_3$	KNO_3
A	KNO_3				30.0				68.3				151.5				438
B	KNO_3 + KCl		72.27		18.07		84.4		40.6		93.6		93.6		100		354.5
C	KCl		71.9				86.9				103.4				135.5		
D	KCl + NaCl	97.0	25.3			91.4	39.7			87.3	55.3			84.1	87.5		
E	NaCl	110.0				111.0				113.0				120.6			
F	NaCl + $NaNO_3$	85.0		88.3		72.7		122.9		63.12		179.6		59.2		334.6	
G	$NaNO_3$			161.6				194.6				241.5				373.1	
H	$NaNO_3$ + KNO_3			173.9	32.3			213.6	82.3			285.7	160.7			495.6	389.4
P	$NaNO_3$ + KNO_3 + NaCl	89.58		93.75	25.0	73.4		135.5	73.4	37.7		234.3	146.4	20.16		439.4	346.8
Q	KCl + NaCl + KNO_3	118.6	1.54		36 86	127.7			71.9	184.5		12.91	126.3	110.5	113.5		342.6

$Cl^- \; NO_3^- \; K^+$

$H_2O + KCl + KNO_3$

t = 17.50°C (38)

% KCl	% KNO_3
KCl	
25.06	0
22.95	5.49
22.59	7.30
21.65	10.19
$KCl + KNO_3$	
21.02	12.28
KNO_3	
20.13	13.54
18.07	13.95
16.13	14.54
12.64	15.82
10.28	17.00
6.58	19.07
4.03	20.84
0	23.81

g per 100g H_2O (307)

t = 5°C

KCl	KNO_3
KCl	
29.76	0.0
16.32	11.40
$KCl + KNO_3$	
29.87	10.14
$NaCl$	
0.0	16.83

t = 25°C

KCl	KNO_3
KCl	
35.98	0
35.80	5
35.54	10
35.12	15
$KCl + KNO_3$	
34.92	22.79
$NaCl$	
15	28.93

$Cl^- \; NO_3^- \; K^+$.—(*Continued*)

g per 100g H_2O (307)

KCl	KNO_3
$NaCl$	
10	31.49
5	34.89
0	38.85

t = 50°C

KCl	KNO_3
KCl	
42.80	
41.39	24.05
$KCl + KNO_3$	
38.75	52.54
$NaCl$	
0.0	85.10

t = 100°C

KCl	KNO_3
KCl	
56.0	
$KCl + KNO_3$	
41.6	199.0
$NaCl$	
0.0	246

g per 100g H_2O (14)

t = 0°C

KCl	KNO_3
KCl	
28.355	0.0
28.425	2.5276
28.360	5.0553
28.760	10.1103

t = 25°C

KCl	KNO_3
KCl	
36.415	0.0
36.500	2.5276
36.165	5.0552
35.880	10.1103
KNO_3	
35.520	15.165
7.4553	32.485
0.0	38.448

$Cl^- \; NO_3^- \; K^+$.—(*Continued*)

t = 25°C (19)

% KCl	% KNO_3
KCl	
27.20	0.0
23.43	11.63
$KCl + KNO_3$	
21.90	16.65
KNO_3	
10.48	22.00
0.0	31.40

$Cl^- \; NH_4^+$ (14)

$H_2O + HCl + NH_4Cl$

g per 100g H_2O

t = 0°C

HCl	NH_4Cl
NH_4Cl	
0.0	29.84
0.9116	28.643
1.8233	27.123
3.6468	24.535

t = 25°C

HCl	NH_4Cl
NH_4Cl	
0.0	39.51
0.9116	38.085
1.8233	36.600
3.6465	33.905

$Cl^- \; NH_4^+ \; AsO_2^-$

$H_2O + NH_4Cl + As_2O_3$

t = 30°C (352)

% NH_4Cl	% As_2O_3
As_2O_3	
0.0	2.26
3.86	2.29
$As_2O_3 + NH_4Cl.As_2O_3$	
7.08	2.28
$NH_4Cl.As_2O_3$	
9.08	1.31
11.76	0.993

$Cl^- \; NH_4^+ \; AsO_2^-$.—(*Cont'd*)

% NH_4Cl	% As_2O_3
$NH_4Cl.As_2O_3$	
21.09	0.490
24.61	0.432
27.18	0.398
$NH_4Cl.As_2O_3 + NH_4Cl$	
29.52	0.291
NH_4Cl	
29.30	0.0

$Cl^- \; NH_4^+ \; CO_3^{--}$ (273)

$H_2O + NH_4Cl + (NH_4)_2CO_3$

t = 0°C

% $(NH_4)_2CO_3$	% NH_4Cl
$(NH_4)_2CO_3$	
35.82	0.0
$(NH_4)_2CO_3 + NH_4Cl$	
30.90	14.42
NH_4Cl	
9.27	19.40
0.0	22.90

t = 15°C

% $(NH_4)_2CO_3$	% NH_4Cl
$(NH_4)_2CO_3$	
38.27	0.0
$(NH_4)_2CO_3 + NH_4Cl$	
31.72	16.27
NH_4Cl	
11.79	21.23
0.0	26.09

$Cl^- \; NH_4^+ \; C_2O_4^{--}$ (82)

$H_2O + NH_4Cl + (NH_4)_2C_2O_4$

°C	% NH_4Cl	% $(NH_4)_2C_2O_4$
$NH_4Cl + (NH_4)_2C_2O_4.H_2O$		
15	26.35	0.14
50	32.55	0.67

$Cl^- \; NH_4^+ \; CO_3^{--} \; Na^+$ (273): $H_2O + NH_4Cl + Na_2CO_3$; *v.* Fig. 31

	Solid phases	Liquid phase—M per 1000M H_2O, t = 0°C: NaCl	t = 0°C: NH_4Cl	t = 0°C: $0.5Na_2CO_3$	t = 0°C: $0.5(NH_4)_2CO_3$	t = 15°C; *v.* Fig. 31: NaCl	t = 15°C: NH_4Cl	t = 15°C: $0.5Na_2CO_3$	t = 15°C: $0.5(NH_4)_2CO_3$
A	NH_4Cl		100.0				118.8		
		26.5	82.5			48.3	85.8		
	$NH_4Cl + NaCl$	86.11	52.8			76.0	68.3		
C	$NaCl$	109.6				109.9			
D	$NaCl + Na_2CO_3.\frac{5}{2}H_2O$	106.2		14.9		89.6		46.5	
E	$Na_2CO_3.\frac{5}{2}H_2O + Na_2CO_3.10H_2O$	93.26		19.36		69.8		48.5	
	$Na_2CO_3.10H_2O$	38.5		30.6		55.4		45.5	
F				48.2				56.0	
G	$Na_2CO_3.10H_2O + Na_2CO_3.\frac{5}{2}H_2O$			41.43	67.5			62.2	70.1
	$Na_2CO_3.\frac{5}{2}H_2O$			23.43	1.87			55.4	103.5
H	$Na_2CO_3.\frac{5}{2}H_2O + (NH_4)_2CO_3$			61.13	240.2			54.0	244.5
					209.3			14.6	222.0
	$(NH_4)_2CO_3$								232.5
I							34		230.0
							48.8		229.5
J			88.9		212.6		105.4		228.7
	$(NH_4)_2CO_3 + NH_4Cl$	48.50	52.5		295.5	80.4	77.8		276
		14.1	74.7		235.8	18.0	90.6		226.3
	$Na_2CO_3.\frac{5}{2}H_2O + (NH_4)_2CO_3$	24.4		28.9	244.0	85.3	23.3		364.7
P	$NH_4Cl + (NH_4)_2CO_3 + Na_2CO_3.\frac{5}{2}H_2O$	72.0	42.7		340.0	144.8	50.6		343.2
	$NH_4Cl + Na_2CO_3.\ H_2O$	75.9	34.2		75.8	99.4	43.7		99.3

Cl^- NH_4^+ CO_3^{--} Na^+.—(*Continued*)

	Solid phases	Liquid phase—M per 1000M H_2O							
		t = 0°C				t = 15°C; *v.* Fig. 31			
		NaCl	NH_4Cl	$0.5Na_2CO_3$	$0.5(NH_4)_2CO_3$	NaCl	NH_4Cl	$0.5Na_2CO_3$	$0.5(NH_4)_2CO_3$
Q	$NH_4Cl + NaCl + Na_2CO_3.\frac{5}{2}H_2O$	91.6	25.7		83.3	106.4	46.9		61.2
	$NH_4Cl + NaCl$	86.1	50.9		14.0	73.6	67.5		4.8
	$NaCl + Na_2CO_3.\frac{5}{2}H_2O$	107.1		7.16	18.0	104.1	14.2		46.0
X	$Na_2CO_3.\frac{5}{2}H_2O + Na_2CO_3.10H_2O$						29.76		39.46

In the work at 15°C (273) no examination of the solid phases found was made. In the later article the writer states that both $Na_2CO_3.5/2H_2O$ and $Na_2CO_3.10H_2O$ were present as solid phases at both 0° and 15° and reports the points E, G, and X separating the $Na_2CO_3.5/2H_2O$ from the $Na_2CO_3.10H_2O$ field.

Cl^- NH_4^+ HCO_3^- Na^+ (122, 384): $H_2O + NH_4HCO_3 + NaCl$; *v.* Fig. 32

	Solid phases	Liquid phase—M per 1000M H_2O															
		t = 0°C (122); *v.* Fig. 32				t = 15°C (122); *v.* Fig. 32				t = 15°C (384)				t=30°C (122); *v.* Fig. 32			
		NH_4HCO_3	NH_4Cl	$NaHCO_3$	NaCl	NH_4HCO_3	NH_4Cl	$NaHCO_3$	NaCl	NH_4HCO_3	NH_4Cl	$NaHCO_3$	NaCl	NH_4HCO_3	NH_4Cl	$NaHCO_3$	NaCl
A	$NaHCO_3$			14.8				18.9				20.5				23.6	
B	$NaHCO_3 + NaCl$			1.6	108.0			2.2	109.1			2.23	109.3			3.1	110.2
C	NaCl				109.6				110.2				110.2				110.9
D	$NaCl + NH_4Cl$		49.1		88.0		67.0		81.9		63.4		83.5		85.9		76.7
E	NH_4Cl		100.3				119.5				117.8				140.2		
F	$NH_4Cl + NH_4HCO_3$	8.3	97.6			14.6	115.2			15.6	114.5			20.7	133.2		
G	NH_4HCO_3	21.96				42.5				42.44				61.6			
H	$NH_4HCO_3 + NaHCO_3$	25.0		10.4		38.9		12.8		45.0		13.45		52.4		14.9	
P	$NaHCO_3 + NH_4HCO_3 + NH_4Cl$		88.56	10.62	17.28		113.04	16.74	9.18		110	18.50	12.8				
Q	$NaHCO_3 + NaCl + NH_4Cl$		49.32	2.16	86.94		67.14	3.24	79.92		70.1	4.51	77.72				

	Solid phases	Liquid phase—M per 1000M H_2O											
		t = 35°C (384)				t = 45°C (122); *v.* Fig. 32				t = 50°C (384)			
		NH_4HCO_3	NH_4Cl	$NaHCO_3$	NaCl	NH_4HCO_3	NH_4Cl	$NaHCO_3$	NaCl	NH_4HCO_3	NH_4Cl	$NaHCO_3$	NaCl
A	$NaHCO_3$			25.5				29.7				31.17	
B	$NaHCO_3 + NaCl$			4.8	115.6			4.1	111.2			5.85	111.2
C	NaCl				111.4				112.3				112.9
D	$NaCl + NH_4Cl$		91.7		74.9		108.4		72.0		116.0		71.1
E	NH_4Cl		146.7				162.5				169.5		
F	$NH_4Cl + NH_4HCO_3$	23.9	146.8							29.64	166.4		
G	NH_4HCO_3	70.37								101.8			
H	$NH_4HCO_3 + NaHCO_3$	64.4		16.09						94.7		19.00	
P	$NaHCO_3 + NH_4HCO_3 + NH_4Cl$	29.6	120.2		24.38					15.33	179.6	24.0	
Q	$NaHCO_3 + NaCl + NH_4Cl$		91.85	6.8	71.44						133.1	10.24	61.44

Cl^- NH_4^+ Zn^{++} (258)
$H_2O + NH_4Cl + ZnCl_2$; *v.* Fig. 33

	Solid phases	Liquid phase					
		t = 0°C		t = 20°C		t = 30°C	
		% NH_4Cl	% $ZnCl_2$	% NH_4Cl	% $ZnCl_2$	% NH_4Cl	% $ZnCl_2$
A	NH_4Cl	22.80		26.9		29.50	
B	$NH_4Cl + 3NH_4Cl.ZnCl_2$	26.30	25.70	29.50	26.00	30.75	26.35
C	$3NH_4Cl.ZnCl_2 + 2NH_4Cl.ZnCl_2$	24.60	42.60	26.00	43.20	27.30	43.80
D	$2NH_4Cl.ZnCl_2$	6.80	62.10	14.50	53.20	17.60	51.20
E	$2NH_4Cl.ZnCl_2 + ZnCl_2$			7.90	66.60	9.25	66.95
F	$ZnCl_2$					3.20	78.50

Cl^- NH_4^+ Pb^{++}: $H_2O + NH_4Cl + PbCl_2$; t = 22°C (46)

M per 1000g H_2O			
NH_4Cl	$0.5PbCl_2$	NH_4Cl	$0.5PbCl_2$
$PbCl_2$		$NH_4Cl.PbCl_2$	
0	0.0749	0.7	0.0099
0.1	0.0325	0.8	0.0087
0.2	0.0194	0.9	0.0083
0.3	0.0153	1.0	0.0080
0.4	0.0138	1.2	0.0075
0.5	0.0130	1.5	0.0073
0.55	0.0123	2.0	0.0077
$NH_4Cl.PbCl_2$		2.5	0.0092
0.6	0.0113	3.0	0.0112
0.65	0.0105	4.0	0.0182

$Cl^- \; NH_4^+ \; Pb^{++}$.—(*Continued*)

M per 1000g H_2O			
NH_4Cl	$0.5PbCl_2$	NH_4Cl	$0.5PbCl_2$
$NH_4Cl.PbCl_2$		$NH_4Cl.PbCl_2 + NH_4Cl$	
5.0	0.0296	7.29	0.0898
6.0	0.0473	NH_4Cl	
7.0	0.0774	7.29	0.0000

$Cl^- \; NH_4^+ \; Hg^{++}$

$H_2O + NH_4Cl + HgCl_2$

t = 30°C (261); *v.* Fig. 34

	Solid phases	Liquid phase % NH_4Cl	Liquid phase % $HgCl_2$
A	NH_4Cl	29.50	
B	$NH_4Cl + 2NH_4Cl.HgCl_2.H_2O$	24.79	50.05
C	$2NH_4Cl.HgCl_2.H_2O + NH_4Cl.HgCl_2.H_2O$	20.02	58.90
D	$NH_4Cl.HgCl_2.H_2O + 2NH_4Cl.3HgCl_2.H_2O$	14.10	57.04
E	$2NH_4Cl.3HgCl_2.H_2O + 2NH_4Cl.9HgCl_2$	9.20	58.65
F	$2NH_4Cl.9HgCl_2 + HgCl_2$	3.62	29.65
G	$HgCl_2$		7.67

$Cl^- \; NH_4^+ \; Hg^{++} \; K^+$

$H_2O + NH_4Cl + HgCl_2 + KCl$; *v.* Figs. 35, 36

t = 25°C (290)

1. Composition of liquid phase and of solid solutions IA, IB, and II in equilibrium at 25°C. Solid solution IA contains from 0–13% K_2Cl_2; IB, 70–100%; II varies continuously from $HgCl_2.(NH_4)_2Cl_2.H_2O$ to $HgCl_2.K_2Cl_2.H_2O$; *v.* Fig. 35.

	Liquid phase in moles				Solid phases in moles—solid solutions				
					IA	IB	II		
	$HgCl_2$	$(NH_4)_2Cl_2$	K_2Cl_2	H_2O	$(NH_4)_2Cl_2$	K_2Cl_2	$HgCl_2$	$(NH_4)_2Cl_2$	K_2Cl_2
A	43.35	56.65		377					
	40.88	55.93	3.91	462	99.9	0.1	50	37.8	12.2
	38.60	53.05	8.35	506	99.9	0.1	50	34.2	15.8
	33.59	53.65	12.76	605	99.0	1.0	50	24.2	25.8
	32.73	52.34	14.93	620	99.1	0.9	50	22.3	27.7
	31.95	51.87	16.18	662	98.9	1.10	50	21.0	29.0
B	30.04	51.26	18.70	660	87.0	13.0	50	18.9	31.10
	30.24	51.31	18.45	665	30.0	70.0	50	18.1	31.9
	29.52	48.00	22.48	730	17.20	82.8	50	15.0	35.0
	28.88	43.10	28.02	854	12.0	88.0	50	8.9	41.1
	28.37	36.94	34.69	880	9.0	91.0	50	7.1	42.9
	26.29	27.92	45.79	1037	4.7	95.3	50	5.4	44.6
	25.30	19.24	55.46	1160	2.6	97.4	50	2.6	47.4
	24.60	11.50	63.90	1276	2.5	97.5	50	1.1	48.9
C	23.45		76.55	1408					

2. Composition of liquid phase at 25°C, expressed in moles, in equilibrium with solid solution II and solid solution III. Solid solution II varies continuously from $HgCl_2.(NH_4)_2Cl_2.H_2O$ to $HgCl_2.K_2Cl_2.H_2O$; solid solution III from 2 $HgCl_2.K_2Cl_2.2H_2O$ to $2HgCl_2.(NH_4)_2Cl_2.2H_2O$; *v.* Fig. 35.

	Liquid phase in moles			
	$HgCl_2$	$(NH_4)_2Cl_2$	K_2Cl_2	H_2O
D	51.37	48.63		312
	49.65	45.79	4.56	409
	48.65	40.47	11.07	506
	47.10	34.22	18.68	641
	45.56	26.95	27.49	778
	42.48	7.20	50.32	1107
E	42.34		57.66	1218

3. Composition of liquid phase at 25°C, expressed in moles, in equilibrium with solid $HgCl_2$ and solid $9HgCl_2.(NH_4)_2Cl_2$; *v.* Fig. 36.

	Liquid phase in moles			
	$HgCl_2$	$(NH_4)_2Cl_2$	K_2Cl_2	H_2O
A	79.43	20.57		6338
	79.02	19.44	1.54	6073
	78.42	17.58	4.00	5787
	78.11	16.82	5.07	5607
	77.56	15.14	7.30	5119
	77.03	12.50	10.47	4712
	76.46	10.40	13.14	4022
	75.64	7.68	16.68	3512
	75.19	5.80	19.01	3000
B	74.88	5.45	19.67	2899

4. Composition, expressed in moles, at 25°C of system solid $HgCl_2$, solid solution IV (points D-E of Fig. 36), and a liquid phase (points B-C of Fig. 36). Solid solution IV varies continuously from $4HgCl_2.K_2Cl_2.4H_2O$ to a mixture containing 6.3% $(NH_4)_2Cl_2$ in place of K_2Cl_2.

Liquid phase				Solid soln. IV			
$HgCl_2$	$(NH_4)_2Cl_2$	K_2Cl_2	H_2O	$HgCl_2$	$(NH_4)_2Cl_2$	K_2Cl_2	H_2O
74.74		25.26	3149	80		20	80
75.02	3.50	21.48	3061	80	1.7	18.3	80
74.84	4.11	21.05	3065	80	2.4	17.6	80
74.29	8.84	16.87	2708	80	6.0	14.0	80
73.69	11.84	14.48	2499	80	6.3	12.7	80

5. Composition, expressed in moles, at 25°C of system solid $9HgCl_2.(NH_4)_2Cl_2$, solid solution IV and a liquid phase (points B-F of Fig. 36).

Liquid phase				Solid soln. IV			
$HgCl_2$	$(NH_4)_2Cl_2$	K_2Cl_2	H_2O	$HgCl_2$	$(NH_4)_2Cl_2$	K_2Cl_2	H_2O
72.90	12.56	14.54	2554	80	5.6	14.4	80
71.41	15.53	13.06	2313	80	6.5	13.5	80

6. Composition of liquid phase (points F-G of Fig. 36), expressed in moles, at 25°C in equilibrium with solid solution IV and solid solution V. Solid solution V consists of varying proportions of $3HgCl_2.(NH_4)_2Cl_2.H_2O$ and $3HgCl_2.K_2Cl_2.H_2O$. It was not possible to determine the composition of either of the solid phases in equilibrium with the four solutions whose composition is given below.

Liquid phase

$HgCl_2$	$(NH_4)_2Cl_2$	K_2Cl_2	H_2O
70.15	17.20	12.65	2067
69.82	14.89	15.29	2245
69.07	11.25	19.68	2416
68.58	7.69	23.73	2507

7. Composition of liquid phase (points I-J of Fig. 36), expressed in moles, at 25°C in equilibrium with solid solution V and solid solution VI. Solid solution VI consists of $2HgCl_2.(NH_4)_2Cl_2.H_2O$ and $2HgCl_2.K_2Cl_2.H_2O$. It was not possible to determine the composition of either of the solid phases in equilibrium with the ten solutions whose composition is given below.

Liquid phase

$HgCl_2$	$(NH_4)_2Cl_2$	K_2Cl_2	H_2O
61.65	38.35		594
61.40	37.52	1.08	562
61.35	37.44	1.21	626
60.70	35.33	3.97	750
60.64	32.59	6.77	966
60.87	27.64	11.49	1358

Cl^- NH_4^+ Hg^{++} K^+.—(*Continued*)

Liquid phase.—(*Continued*)

$HgCl_2$	$(NH_4)_2Cl_2$	K_2Cl_2	H_2O
61.21	25.22	13.57	1533
61.44	23.24	15.32	1647
61.82	20.53	17.65	1832
63.72	14.45	21.83	2175
65.90	7.71	26.39	2475

8. Composition of liquid phase (points J-K of Fig. 36), expressed in moles, at 25°C in equilibrium with solid solution IV and solid solution VI. It was not possible to determine the composition of either of the solid phases in equilibrium with the two solutions whose composition is given below.

Liquid phase

$HgCl_2$	$(NH_4)_2Cl_2$	K_2Cl_2	H_2O
67.64		32.36	2729
68.08	2.42	29.50	2644

9. Composition of liquid phase (points L-G of Fig. 36), expressed in moles at 25°C in equilibrium with solid $9HgCl_2.(NH_4)_2Cl_2$ and solid solution V.

Liquid phase

$HgCl_2$	$(NH_4)_2Cl_2$	K_2Cl_2	H_2O
68.60	31.40		965

Cl^- NH_4^+ Cu^{++} (133, 259, 312)

$H_2O + NH_4Cl + CuCl_2$; *v.* Fig. 37

	Solid phases	Liquid phase					
		t = 0.2°C (312)		t = 25°C (312)		t = 30°C (259)	
		% NH_4Cl	% $CuCl_2$	% NH_4Cl	% $CuCl_2$	% NH_4Cl	% $CuCl_2$
A	NH_4Cl			28.10		29.5	
B	NH_4Cl and solid soln. I*	22.28	1.62	27.69	1.78	28.60	1.90
C	Solid soln. I*	7.49	15.09	10.94	16.35	19.80	7.70
						12.10	15.60
						4.9	29.40
D	Solid soln. I* and $CuCl_2.2H_2O$	0.75	40.80	1.79	43.30	2.0	43.20
E	$CuCl_2.2H_2O$		41.00		43.40		43.90

* Solid soln. I, found by (312) at 0.2 and 25°C, varies but slightly from the composition $CuCl_2.2NH_4Cl.2H_2O$ found in these solid phases by (259).

t = 25°C (133)

% NH_4Cl	% $CuCl_2$	% NH_4Cl	% $CuCl_2$
Solid soln.*		Solid soln.* + $2NH_4Cl.CuCl_2.2H_2O$	
28.13	1.08	27.72	1.83
27.90	1.35		
27.83	1.66		

* Solid soln. = $NH_4Cl + CuCl_2$.

Cl^- NH_4^+ Cu^{++} Ba^{++}

$H_2O + NH_4Cl + CuCl_2 + BaCl_2$; *v.* Fig. 38

t = 30°C (338)

	Solid phases	Liquid phase		
		% NH_4Cl	% $BaCl_2$	% $CuCl_2$
A	NH_4Cl	29.50		
B	$NH_4Cl + BaCl_2.2H_2O$	25.83	7.97	
C	$BaCl_2.2H_2O$		27.60	
D	$BaCl_2.2H_2O + CuCl_2.2H_2O$		2.71	42.34
E	$CuCl_2.2H_2O$			43.95
F	$CuCl_2.2H_2O + 2NH_4Cl.CuCl_2.2H_2O$	2.03		43.20
G	$2NH_4Cl.CuCl_2.2H_2O + NH_4Cl$	28.60		1.90
P	$NH_4Cl + 2NH_4Cl.CuCl_2.2H_2O + BaCl_2.2H_2O$	25.17	7.30	1.73
Q	$2NH_4Cl.CuCl_2.2H_2O + BaCl_2.2H_2O + CuCl_2.2H_2O$	2.12	2.38	41.58

Cl^- NH_4^+ Cu^{++} K^+

$H_2O + NH_4Cl + CuCl_2 + KCl$

t = 17°C (128)

M % $2KCl.CuCl_2.2H_2O$*

In solid phases	In satd. soln.
Solid soln. I	
8.25	17.06
8.33	17.42
9.63	18.85
7.69	20.69
8.70	23.20
9.07	23.90
9.92	24.48
11.56	25.88
13.88	30.95
16.04	31.31
13.60	31.96
14.86	34.58
15.02	35.90
17.36	38.09
19.01	41.49
23.61	44.10
24.47	48.36
26.37	50.67
27.77	73.52
Solid soln. II	
54.87	74.24
53.29	75.33
58.80	78.54
76.74	89.50

* The author (128) shows that two isomorphous salts, $2NH_4Cl.CuCl_2.2H_2O$ and $2KCl.CuCl_2.2H_2O$ form two series of mixed crystals at 17°C. One contains up to 27.77M % of the potassium double salt; the other from 54.87 to 76.74M %.

Cl^- NH_4^+ Ag^+

$H_2O + NH_4OH + AgCl$

t = 25°C (370)

% AgCl	% NH_3
AgCl	
0.326	0.736
1.640	2.766
4.770	5.760
7.034	7.429
7.656	7.965
AgCl + $2AgCl.3NH_3$	
8.907	8.773
$2AgCl.3NH_3$	
9.091	9.082
10.476	14.954
10.825	15.832
10.670	17.655

Cl^- NH_4^+ $IrCl_6^{--}$

$H_2O + NH_4Cl + (NH_4)_2IrCl_6$

t = 20°C (13)

M_{NH_4Cl}/l	g $(NH_4)_2IrCl_6$/l
$(NH_4)_2IrCl_6$	
2.0	0.027
1.0	0.64
0.2	0.78
0.1	1.793

Cl^- NH_4^+ $PtCl_6^{--}$

$H_2O + NH_4Cl + (NH_4)_2PtCl_6$

t = 20°C (13)

M_{NH_4Cl}/l	g $(NH_4)_2PtCl_6$/l
$(NH_4)_2PtCl_6$	
2.0	0.024
1.0	0.028
0.2	0.186
0.1	0.423

Cl^- NH_4^+ Mn^{++} (77, 138)

$H_2O + NH_4Cl + MnCl_2$; *v.* Figs. 39, 40

	Solid phases	Liquid phase			
		t = 25°C		t = 60°C	
		% NH_4Cl	% $MnCl_2$	% NH_4Cl	% $MnCl_2$
A	Solid soln. A*	28.33		33.52	2.91
		25.11	5.37	31.93	5.84
		22.35	10.70	29.50	10.16
		20.30	14.62		
B	Solid soln. A + Solid soln. B	19.48	16.04	27.81	12.95
	Solid soln. B	18.37	17.54	27.07	13.79
		16.90	19.39	25.28	15.91
		15.41	21.42	22.51	18.86
		14.26	23.02	19.04	22.42
		12.69	24.83	14.33	27.74
		8.56	30.16	10.52	32.80
		5.53	35.42	5.44	43.10
		4.86	37.02	3.93	47.20
		3.85	39.53	2.94	49.33
C	Solid soln. B + Solid soln. C	2.95	43.22	2.45	50.22
	Solid soln. C	2.26	43.28	2.21	50.68
		1.31	43.31	1.61	51.16
			43.45	0.91	51.47

* The authors (78) show that the percentages of NH_4Cl in the A-B series of

solid solutions, which are simultaneously in equilibrium with a liquid phase containing the proper proportions of NH_4Cl and $MnCl_2$, differ when the temperatures concerned vary from 70 to 24°C, but that they become identical at slightly below 25°C, as shown in Fig. 40. Richards [309] shows that $MnCl_2.4H_2O$ and $MnCl_2.2H_2O$ are in equilibrium with the saturated solution at 58.098°C.

Cl^- NH_4^+ Fe^{++}

$H_2O + NH_4Cl + FeCl_2$

t = 70°C [75]; *v.* Fig. 41

	% NH_4Cl	% $FeCl_2$
	Solid soln. I*	
A	31.39	9.52
B	18.61	26.56
	Solid soln. I + Solid soln. II†	
C	6.76	41.18
	Solid soln. II	
D	2.69	46.42
	$FeCl_2.4H_2O$	
E	1.64	46.61
	0	46.90

* Solid soln. I (NH_4Cl, $FeCl_2.2H_2O$) contains from 100 to *ca.* 28 % NH_4Cl.

† Solid soln. II (NH_4Cl, $FeCl_2.2H_2O$) contains from *ca.* 26.5 to *ca.* 8 % NH_4Cl.

Cl^- NH_4^+ Fe^{+++} [76]

$H_2O + NH_4Cl + FeCl_3$; *v.* Figs. 42, 43

	Solid phases	Liquid phase, t = 25°C (Fig. 42), % NH_4Cl	% $FeCl_3$	t = 60°C (Fig. 43), % NH_4Cl	% $FeCl_3$
A	NH_4Cl	28.10	0	36.00	0
B	Solid soln. I + Solid soln. II	16.63	30.45	24.73	25.78
C	Solid soln. II + $NH_4Cl.FeCl_3$			9.50	65.30
D	$NH_4Cl.FeCl_3$ + $NH_4Cl.4FeCl_3.6H_2O$			1.36	75.84
E	$NH_4Cl.4FeCl_3.6H_2O$ + $FeCl_3.2H_2O$			0.18	78.20
F	$FeCl_3.2H_2O$			0	78.42
G	Solid soln. II + $FeCl_3.6H_2O$	2.29	49.50		
H	$FeCl_3.6H_2O$	0	49.60		

Cl^- NH_4^+ Co^{++} [75, 133]: $H_2O + NH_4Cl + CoCl_2$

t = 60°C [75]; *v.* Fig. 44

	% NH_4Cl	% $CoCl_2$
	Solid soln. I	
A	29.10	10.11
B	17.74m*	31.24m*
C	13.08m*	37.05m*
D	11.71	38.96
E	10.36	40.14
F	0.9	48.62
G	16.87	30.94
H	11.80	37.01

t = 25°C [133]

% NH_4Cl	% $CoCl_2$
Solid soln. I†	
17.9	15.63
13.59	25.19
8.75	34.28
Solid soln. I + $CoCl_2.6H_2O$	
7.54	34.93

* The stable system consists of a second series of solid solutions, whose composition, as shown in Fig. 44, varies but little.

† Solid soln. I = NH_4Cl + $CoCl_2.2H_2O$.

Cl^- NH_4^+ Ni^{++} [75, 133]: $H_2O + NH_4Cl + NiCl_2$

t = 70°C [75]; *v.* Fig. 45

	% NH_4Cl	% $NiCl_2$
	Solid soln. A*	
A	30.92	8.59
B	18.37	30.03
	Solid soln. B†	
C	17.54	30.69
D	5.35	43.87
	$NiCl_2.2H_2O$	
E	2.79	44.99
F	0.0	45.80

* Solid soln. A(NH_4Cl, $NiCl_2.2H_2O$) contains from 100 to 68.8 % NH_4Cl.

† Solid soln. B (NH_4Cl, $NiCl_2.2H_2O$) contains from 62.5 to [illegible] % NH_4Cl.

t = 25°C [133]

% NH_4Cl	% $NiCl_2$
Solid soln.‡	
26.07	3.10
22.27	8.04
20.68	10.32
17.43	15.01
11.22	26.93
9.90	32.82
9.16	35.70
Solid soln.‡ + $NiCl_2.6H_2O$	
8.15	37.56
$NiCl_2.6H_2O$	
7.51	37.19
3.06	37.98
0	37.53

‡ NH_4Cl + $NiCl_2.2H_2O$.

Cl^- NH_4^+ $B_4O_7^{--}$

$H_2O + NH_4Cl + (NH_4)_2B_4O_7$ [329]

Solid phases	Liquid phase, t = 0°C, % NH_4Cl	% $(NH_4)_2B_4O_7$	t = 10°C, % NH_4Cl	% $(NH_4)_2B_4O_7$	t = 25°C, % NH_4Cl	% $(NH_4)_2B_4O_7$
NH_4Cl	22.82		25.01		28.28	
NH_4Cl + $(NH_4)_2B_4O_7.4H_2O$	22.14	1.77	24.42	1.98	27.11	3.83
$(NH_4)_2B_4O_7.4H_2O$		3.76		5.26		8.99

Cl^- NH_4^+ $B_4O_7^{--}$ Na^+; *v.* p. 297

Cl^- NH_4^+ Mg^{++} [34]

$H_2O + NH_4Cl + MgCl_2$; *v.* Fig. 47

	Solid phases	Liquid phase, t = 3.5°C, % NH_4Cl	% $MgCl_2$	t = 25°C, % NH_4Cl	% $MgCl_2$	t = 50°C, % NH_4Cl	% $MgCl_2$
A	NH_4Cl	23.81		27.79		33.16	
B	NH_4Cl + $NH_4Cl.MgCl_2.6H_2O$	5.93	21.41	8.78	20.95	12.46	20.84
C	$NH_4Cl.MgCl_2.6H_2O$ + $MgCl_2.6H_2O$	0.09	34.43	0.09	35.41	0.15	36.92
D	$MgCl_2.6H_2O$		34.48		35.59		36.97

Cl^- NH_4^+ Mg^{++} K^+

$H_2O + NH_4Cl + MgCl_2 + KCl$

t = 25°C [34]

% NH_4Cl	% $MgCl_2.6H_2O$	% KCl
Solid soln. I*		
0.12	61.06	1.52
0.14	59.78	2.10
0.27	58.52	2.48
0.33	57.80	2.74
Solid soln. II†		
0.42	57.37	2.86
0.44	57.50	2.72
Solid soln. III‡		
0.59	56.84	2.67
0.47	59.03	2.10
0.73	55.57	3.09
1.83	50.51	4.45
2.48	50.90	3.46
3.35	47.55	4.49
5.81	47.57	1.42

* Solid soln. I contains from 0 to 15M % $NH_4Cl.MgCl_2.6H_2O$ and from 100 to 85 % $KCl.MgCl_2.6H_2O$. Forms rhombic pseudo-hexagonal crystals.

† Solid soln. II contains from 15 to 27M % $NH_4Cl.MgCl_2.6H_2O$. The crystals show inclined extinction and are probably monoclinic.

‡ Solid soln. III contains from 27 to 100M % $NH_4Cl.MgCl_2.6H_2O$. The crystals are rhombic pseudo-tetragonal.

Cl^- NH_4^+ Ba^{++} [338, 341.5]

$H_2O + NH_4Cl + BaCl_2$

°C [341.5]	% NH_4Cl	% $BaCl_2$
	NH_4Cl + $BaCl_2.2H_2O$	
−16.2	16.10	8.07
0	19.26	8.22
+30	24.89	8.19
40	26.93	8.40
50	29.53	8.55
	t = 30°C [338]	
	NH_4Cl	
	29.5	0.0
	27.47	3.56
	NH_4Cl + $BaCl_2.2H_2O$	
	25.93	7.97
	$BaCl_2.2H_2O$	
	24.69	8.33
	20.00	10.89
	13.84	15.42
	10.06	18.36
	5.71	22.16
	0.0	27.60

Cl^- NH_4^+ Na^+

$H_2O + NH_4OH + NaCl$

t = 30°C [171]; *v. also* p. 297

% NH_3	% NaCl
NaCl	
2.516	25.00
3.488	25.09
4.074	24.97
5.288	24.93
6.318	24.84
6.381	24.84
7.243	24.55
8.700	24.14

$Cl^- \; NH_4^+ \; B_4O_7^{--} \; Na^+$ (329)

$H_2O + NH_4Cl + Na_2B_4O_7$; *v.* Fig. 46

	Solid phases	Liquid phase—M per 1000M H_2O											
		t = 0°C				t = 10°C				t = 25°C (*v.* Fig. 46)			
		NH_4Cl	$0.5(NH_4)_2B_4O_7$	NaCl	$0.5Na_2B_4O_7$	NH_4Cl	$0.5(NH_4)_2B_4O_7$	NaCl	$0.5Na_2B_4O_7$	NH_4Cl	$0.5(NH_4)_2B_4O_7$	NaCl	$0.5Na_2B_4O_7$
A	$(NH_4)_2B_4O_7.4H_2O$		7.32				10.41				18.58		
B	$(NH_4)_2B_4O_7.4H_2O + NH_4Cl$	97.92	4.35			111.66	5.06			132.10	10.40		
C	NH_4Cl	99.52				112.22				132.70			
D	$NH_4Cl + NaCl$	49.00		85.76		60.71		81.18		81.14		77.35	
E	NaCl			109.34				109.99				110.64	
F	$NaCl + Na_2B_4O_7.10H_2O$			108.06	0.85			109.22	0.97			109.53	1.80
G	$Na_2B_4O_7.10H_2O$				1.98				2.90				5.69
H	$Na_2B_4O_7.10H_2O + (NH_4)_2B_4O_7.4H_2O$		6.38		1.52		9.79		2.35		19.96		6.26
	$Na_2B_4O_7.10H_2O + NaCl + NH_4Cl$	49.33		85.79	1.58								
	$Na_2B_4O_7.10H_2O + NH_4Cl$	58.71		69.14	1.92								
		68.87		48.82	1.97								
		74.10		40.57	2.92								
P	$NaCl + NH_4Cl + Na_2B_4O_7.10H_2O$					61.38		80.33	2.34	85.16		71.49	9.80
	$NH_4Cl + Na_2B_4O_7.10H_2O$					76.50		51.42	3.99	97.99		50.00	13.0
						91.50		30.14	5.00				
Q	$NH_4Cl + Na_2B_4O_7.10H_2O + (NH_4)_2B_4O_7.4H_2O$	87.14		21.22	3.77	95.05		25.98	6.30	105.52		38.32	14.83
	$Na_2B_4O_7.10H_2O + (NH_4)_2B_4O_7.4H_2O$	74.98		17.06	3.57	73.94		18.09	5.71	93.90		32.0	13.90
		48.71		10.84	3.22	58.70		12.35	4.79	78.9		25.0	12.80
	$Na_2B_4O_7.10H_2O + NaCl$					39.20		91.52	2.25				
	$(NH_4)_2B_4O_7.4H_2O + NH_4Cl$					112.7		0.03	4.41				

$Cl^- \; NH_4^+ \; Na^+$ (311, 329)

$H_2O + NH_4Cl + NaCl$

Solid phases	Liquid phase															
	t = 0°C(311)		t = 0°C(329)		t = 10°C(329)		t = 25°C(329)		t = 25°C(311)		t = 40°C(311)		t = 60°C(311)		t = 80°C(311)	
	% NH_4Cl	% NaCl	% NH_4Cl	% NaCl	% NH_4Cl	% NaCl	% NH_4Cl	% NaCl	% NH_4Cl	% NaCl	% NH_4Cl	% NaCl	% NH_4Cl	% NaCl	% NH_4Cl	% NaCl
NH_4Cl	22.9	0	22.82		25.01		28.28		28.2	0	31.4	0	35.6	0	39.6	0
	15.3	11.1							21.5	8.9						
$NH_4Cl + NaCl$	10.2	19.9	10.22	19.57	12.49	18.26	16.16	16.82	15.9	17.10	19.4	15.5	24.4	15.7	29.5	12.0
NaCl	0	26.3		26.20		26.32		26.43	0	26.4	0	26.7	0	27.0	0	27.5

$Cl^- \; NH_4^+ \; K^+$ (387)

$H_2O + NH_4Cl + KCl$; *v.* Fig. 48

L = g NH_4Cl/100g of dissolved salt; S = g NH_4Cl/100g of solid

	Solid phases	Liquid phase					
		t = 25°C		t = 65°C		t = 90°C	
		L	S	L	S	L	S
	Solid soln. I*	10.4	0.0	11.6	0.0	23.7	2.7
A		26.9	0.0	25.0	1.6	31.0	6.0
B		49.7	4.5	42.8	8.1	39.0	9.0
C		64.3	14.0	54.2	14.2	46.5	12.4
D		66.1	17.0	69.3	29.9	68.3	35.6
				70.7	33.7	73.8	48.1
	Solid soln. I* + Solid soln. II†	67.4	23.5	72.0	48.1	77.8	75.1
E		69.6	94.7	72.2	73.4	77.8	79.0

* Solid soln. I at 25°C = 0–21 % NH_4Cl; at 65°C = 0–38 % NH_4Cl; at 90°C = 0–62 % NH_4Cl.

† Solid soln. II at 25°C = 93–100 % NH_4Cl; at 65°C = 90–100 % NH_4Cl, at 90°C = 87–100 % NH_4Cl.

$Cl^- \; NH_4^+ \; K^+$.—*(Continued)*

Solid phases	Liquid phase					
	t = 25°C		t = 65°C		t = 90°C	
	L	S	L	S	L	S
Solid soln. II†	73.2	96.3	76.5	95.5	80.6	92.9
	84.2	100.0	79.4	98.4	86.1	98.8
			88.1	100.0	88.8	100.0

t = 25°C (34)

% NH_4Cl	% KCl	% NH_4Cl	% KCl
Solid soln. I‡		Solid soln. I‡	
5.13	22.29	22.04	10.49
7.0	20.40	21.68	10.40
11.0	18.04	Solid soln. I‡ + Solid soln. II§	
13.73	16.11	21.95	10.48
15.46	14.53	Solid soln. II§	
19.54	12.16	24.30	6.48

‡ Solid soln. I contains from 0 to 15.12 % NH_4Cl.

§ Solid soln. II contains from 79.32 to 100 % NH_4Cl.

Cl^- HPO_4^{--} Na^+ (99, 269, 286)

$H_2O + NaCl + Na_2HPO_4$; *v.* Fig. 49

	°C	Solid phases	Liquid phase % Na_2HPO_4	Liquid phase % NaCl
A	−21.2	$NaCl.2H_2O$ + Ice		22.42
B	+15.0	$NaCl.2H_2O$		
C	100	NaCl		28.15
D	− 0.9	$Na_2HPO_4.12H_2O$ + Ice	1.87	
E	+35.4	$Na_2HPO_4.12H_2O + Na_2HPO_4.7H_2O$	31.55	
F	48.35	$Na_2HPO_4.7H_2O + Na_2HPO_4.2H_2O$	44.10	
G	95.2	$Na_2HPO_4.2H_2O + Na_2HPO_4$	51.69	
H	99.77	Na_2HPO_4	50.68	
I	−23.0	$NaCl.2H_2O + Na_2HPO_4.12H_2O$ + Ice	0.64	22.04
J	− 1.8	$NaCl.2H_2O + NaCl + Na_2HPO_4.12H_2O$	1.22	25.52
K	+19.52	$NaCl + Na_2HPO_4.12H_2O + Na_2HPO_4.7H_2O$	4.74	23.59
L	39.30	$NaCl + Na_2HPO_4.7H_2O + Na_2HPO_4.2H_2O$	20.09	15.80
M	79.50	$NaCl + Na_2HPO_4.2H_2O + Na_2HPO_4$	24.22	15.31

Cl^- AsO_2^- Ca^{++}

$H_2O + As_2O_3 + CaCl_2$

t = 19.5–20°C (354)

% As_2O_3	% $CaCl_2$
As_2O_3	
1.78	0.0
1.39	12.66
1.01	23.09
0.865	27.68
0.697	36.01
$As_2O_3 + CaCl_2.6H_2O$	
0.675	41.92
$CaCl_2.6H_2O$	
0.0	42.70*

Cl^- AsO_2^- Sr^{++}

$H_2O + As_2O_3 + SrCl_2$

t = 30°C (354)

% As_2O_3	% $SrCl_2$
As_2O_3	
2.26	0
2.14	6.27
1.92	13.67
1.67	21.29
1.46	27.46
1.28	34.03
$As_2O_3 + SrCl_2.6H_2O$	
1.23	36.16
$SrCl_2.6H_2O$	
0	37.60*

Cl^- AsO_2^- Ba^{++}

$H_2O + As_2O_3 + BaCl_2$

t = 30°C (354)

% As_2O_3	% $BaCl_2$
As_2O_3	
2.26	0
2.24	3.84
2.20	8.72
2.19	8.86
2.15	10.34
$(As_2O_3)_2.BaCl_2$	
1.69	9.55

* By interpolation from earlier work.

Cl^- AsO_2^- Ba^{++}.—(*Continued*)

% As_2O_3	% $BaCl_2$
$(As_2O_3)_2.BaCl_2$	
1.12	13.62
0.905	16.93
0.737	20.06
0.608	23.87
$(As_2O_3)_2.BaCl_2 + BaCl_2.2H_2O$	
0.506	26.54
$BaCl_2.2H_2O$	
0	27.60*

Cl^- AsO_2^- Li^+

$H_2O + As_2O_3 + LiCl$

t = 30°C (353)

% As_2O_3	% LiCl
As_2O_3	
2.26	0.0
1.69	7.57
1.15	15.30
0.77	22.67
0.54	29.04
0.43	35.37
0.377	41.55
$As_2O_3 + LiCl.H_2O$	
0.410	45.12
$LiCl.H_2O$	
0.0	46.10*

Cl^- AsO_2^- Na^+

$H_2O + As_2O_3 + NaCl$

t = 30°C (352)

% As_2O_3	% NaCl
As_2O_3	
2.26	0.0
2.18	5.93
2.04	11.49
1.88	16.86
1.71	22.06
As_2O_3 + NaCl	
1.58	26.16
NaCl	
0.0	26.50

Cl^- AsO_2^- K^+

$H_2O + As_2O_3 + KCl$

t = 30°C (352)

% As_2O_3	% KCl
As_2O_3	
2.26	0.0
2.40	6.58
2.46	10.37
$6As_2O_3.5KCl$	
2.10	11.22
1.77	13.59
1.52	15.89
1.34	17.72
1.10	20.67
0.995	22.38
0.898	22.92
0.841	25.23
$6As_2O_3.5KCl$ + KCl	
0.780*	27.04*
KCl	
0.0	27.20

* Average value.

Cl^- Sb^{+++} (33)

$H_2O + HCl + Sb_2O_3$

t = 15°C

M per 1000M H_2O

$SbCl_3$	HCl
$Sb_4O_5Cl_2$	
0.009	4.20
0.015	4.60
0.029	20.00
0.167	27.60
SbOCl	
0.8	36.6
2.70	44.0
8.90	47.8
25.60	48.5
47.50	52.0
66.80	52.4
t = 20°C	
$SbCl_3$	
724	
712	24
699	61
685	82.5
689	91
681	117
628	287
SbOCl	
197	84.5
217	74
250	88
$(SbOCl)_x.(SbCl_3)_y$	
358	79
440	68
637	62
698	53
$SbCl_3 + (SbOCl)_x.(SbCl_3)_y$	
688	39.5
t = 50°C	
$Sb_4O_5Cl_2$	
0.008	1.80
0.08	15.80
0.012	20.00
0.460	27.6

Cl^- Bi^{+++}

$H_2O + HCl + Bi(OH)_3$

t = 25°C (284)

M per 1000g H_2O

$BiCl_3$	HCl
BiOCl(?)	
0.0013	0.3438
0.00396	0.4295
0.00869	0.4960
0.01323	0.5399
0.01856	0.5742
0.03138	0.6434
0.05338	0.7223
0.08937	0.8079
0.1324	0.8752
0.1810	0.9891
0.2050	1.020
0.2657	1.105
0.5685	1.481
0.8324	1.758
1.100	2.025
1.317	2.115

Herz and Bulla (180) give experimental data on the hydrolysis of $BiCl_3$ at 25°C. They obtained values ranging from 0.021 to 0.033 for the constant $(BiCl_3) \div (HCl)^2$.

Cl^- CO_3^{--} HCO_3^- Co^{++} K^+

$H_2O + CoCl_2 + K_2CO_3 + KHCO_3$

t = 18°C (7)

g K_2CO_3/l	g $KHCO_3$/l
$CoCO_3.K_2CO_3.4H_2O + KHCO_3$	
13.3	280.6
25.5	272.4
103.2	237.0
125.1	227.6
166.8	203.2
289.4	158.9
453.5	108.4
607.7	68.9
704.3	54.6
$CoCO_3.K_2CO_3.4H_2O + KHCO_3 + K_2CO_3.2KHCO_3.3H_2O$	
800.2	43.1
$CoCO_3.K_2CO_3.4H_2O + K_2CO_3.2KHCO_3.3H_2O$	
805.1	40.9
822.8	35.0
$CoCO_3.K_2CO_3.4H_2O + K_2CO_3.2KHCO_3.3H_2O + K_2CO_3.2H_2O$	
825.8	33.10
$CoCO_3.K_2CO_3.4H_2O + K_2CO_3.2H_2O$	
836.2	12.20
840.8	5.9

Cl^- CO_3^{--} HCO_3^- Na^+ (141): $H_2O + NaCl + Na_2CO_3 + NaHCO_3$; *v.* Fig. 50

	t = 0°C			t = 15°C			t = 20°C		
	% Na_2CO_3	% $NaHCO_3$	% NaCl	% Na_2CO_3	% $NaHCO_3$	% NaCl	% Na_2CO_3	% $NaHCO_3$	% NaCl
$NaHCO_3$									
		6.5			8.1			8.7	
$NaHCO_3 + Na_2CO_3.10H_2O$									
	5.6	4.6		13.3	4.3		17.05	4.0	
$Na_2CO_3.10H_2O$									
	6.6			14.1			17.6		
$Na_2CO_3.10H_2O + NaCl$									
	2.8		24.2	9.2		20.2	13.5		17.4
NaCl									
			26.3			26.3			26.4
$NaCl + NaHCO_3$									
		0.6	25.9		0.9	26.1		1.0	26.1
$NaHCO_3 + Na_2CO_3.10H_2O$									
	3.78	3.51	4.81	11.42	4.05	3.06			
	2.89	2.83	9.53	9.62	2.33	7.71			
	2.39	2.14	15.14						
	2.63	0.92	21.32						
$NaHCO_3 + Na_2CO_3.10H_2O + Na_2CO_3.NaHCO_3.2H_2O$									
	2.77	1.11	22.84	9.74	1.41	11.19	16.17	3.40	2.22
$NaCl + Na_2CO_3.10H_2O + Na_2CO_3.NaHCO_3.2H_2O$									
	2.99	0.73	23.86	9.11	0.19	20.49	13.4	0.61	17.54
$NaHCO_3 + Na_2CO_3.NaHCO_3.2H_2O$									
				4.80	1.91	18.52	14.6	3.51	3.87
							12.7	3.09	6.03
							11.52	2.86	7.64
							6.99	2.83	13.43
$NaHCO_3 + NaCl + Na_2CO_3.NaHCO_3.2H_2O$									
	2.75*	0.94*	23.87*	3.25	0.61	23.93	2.60	1.53	23.74
$NaHCO_3 + NaCl$									
	1.30	0.73	25.05						
$Na_2CO_3.10H_2O + Na_2CO_3.NaHCO_3.2H_2O$									
				8.48	1.38	15.24	13.40	2.60	7.90
							12.58	1.07	13.97
$NaCl + Na_2CO_3.NaHCO_3.2H_2O$									
				6.41	0.08	22.18	8.48	0.69	20.50
				4.70	0.31	23.22	5.35	0.84	22.38

* Average of two results.

	t = 25°C; *v.* Fig. 50			t = 30°C			t = 35°C		
	% Na_2CO_3	% $NaHCO_3$	% NaCl	% Na_2CO_3	% $NaHCO_3$	% NaCl	% Na_2CO_3	% $NaHCO_3$	% NaCl
$NaHCO_3$									
A		9.3			9.9			10.6	
$NaHCO_3 + Na_2CO_3.NaHCO_3.2H_2O$									
B	17.9	4.05		17.6	4.03		17.3	4.7	
$Na_2CO_3.10H_2O + Na_2CO_3.NaHCO_3.2H_2O$									
C	22.6	1.5		27.4	1.3				
$Na_2CO_3.10H_2O$									
D	22.7			28.45					
$Na_2CO_3.7H_2O$									
							32.9		
$Na_2CO_3.10H_2O + Na_2CO_3.7H_2O$									
E	19.0		11.8	26.0		3.9			
$Na_2CO_3.7H_2O + Na_2CO_3.NaHCO_3.2H_2O$									
							32.5	0.6	
$Na_2CO_3.7H_2O + NaCl$									
F	17.3		15.5	21.2		12.9			
	17.2		15.4						
$Na_2CO_3.7H_2O + Na_2CO_3.H_2O$									
							31.0		2.5
$Na_2CO_3.H_2O + NaCl$									
				17.7		15.0	16.8		16.1
NaCl									
G			26.4			26.5			26.6
$NaCl + NaHCO_3$									
H		1.2	26.0		1.2	26.1		1.2	26.2
$Na_2CO_3.10H_2O + Na_2CO_3.NaHCO_3.2H_2O$									
	19.84	1.34	5.01						
	18.99	0.76	11.09						
$Na_2CO_3.10H_2O + Na_2CO_3.7H_2O + Na_2CO_3.NaHCO_3.2H_2O$									
R	18.99	0.80	11.38	26.61	0.99	3.65			
$Na_2CO_3.7H_2O + Na_2CO_3.H_2O + Na_2CO_3.NaHCO_3.2H_2O$									
				22.63	0.61	9.88	30.27	0.57	1.97
$Na_2CO_3.H_2O + NaCl + Na_2CO_3.NaHCO_3.2H_2O$									
				17.79	0.53	14.88	17.04	0.61	15.52
$Na_2CO_3.7H_2O + Na_2CO_3.NaHCO_3.2H_2O$									
	18.56	0.53	12.84						
$Na_2CO_3.7H_2O + NaCl + Na_2CO_3.NaHCO_3.2H_2O$									
Q	17.28	0.34	15.28						
$NaCl + Na_2CO_3.NaHCO_3.2H_2O$									
	13.28	0.61	17.72	13.2	0.99	17.69	13.23	0.57	17.85
	7.28	0.53	21.35	7.33	0.96	21.30	7.42	0.61	21.41
$NaHCO_3 + Na_2CO_3.NaHCO_3.2H_2O$									
	11.35	2.90	7.57	11.20	3.32	7.70	11.57	3.59	7.61
	6.65	1.95	15.04	6.7	2.25	14.96	6.72	2.56	14.85
							5.52	2.10	16.97
$NaHCO_3 + NaCl + Na_2CO_3.NaHCO_3.2H_2O$									
P	2.55	1.38	23.97	25.3	1.68	24.01	3.25	0.76	23.75
							3.01	1.34	23.92
$Na_2CO_3.H_2O + Na_2CO_3.NaHCO_3.2H_2O$									
							21.96	0.12	8.3
							18.46	0.11	12.08

	t = 45°C			t = 60°C		
	% Na_2CO_3	% $NaHCO_3$	% NaCl	% Na_2CO_3	% $NaHCO_3$	% NaCl
$NaHCO_3$						
		12.0				
$NaHCO_3 + Na_2CO_3.NaHCO_3.2H_2O$						
	16.9	5.9		16.9	7.4	
$Na_2CO_3.NaHCO_3.2H_2O + Na_2CO_3.H_2O$						
	31.7	0.9		30.7	1.3	
$Na_2CO_3.H_2O$						
	32.2			31.8		
$Na_2CO_3.H_2O + NaCl$						
	15.0		17.4	13.9		17.8
NaCl						
			26.7			27.0
$NaCl + NaHCO_3$						
		1.5	26.2		2.2	26.4

Cl^- CO_3^{--} HCO_3^- Na^+.—*(Continued)*

$t = 45°C$			$t = 60°C$		
% Na_2CO_3	% $NaHCO_3$	% NaCl	% Na_2CO_3	% $NaHCO_3$	% NaCl
$Na_2CO_3.H_2O + Na_2CO_3.NaHCO_3.2H_2O$					
23.35	1.03	7.84	25.89	1.57	4.73
18.97	0.50	12.62	18.87	0.80	11.94
$Na_2CO_3.H_2O + NaCl + Na_2CO_3.NaHCO_3.2H_2O$					
14.34	0.61	17.40	12.39	0.53	19.13
$Na_2CO_3.NaHCO_3.2H_2O + NaCl$					
9.25	0.15	20.62	10.75	0.73	20.06
6.84	0.50	21.98			
6.29	0.76	22.35			
4.29	1.11	23.43			
$NaHCO_3 + Na_2CO_3.NaHCO_3.2H_2O$					
12.44	5.08	5.38	14.0	6.11	3.73
10.75	3.29	8.91	8.99	4.16	11.34
6.94	2.52	14.70			
$NaHCO_3 + NaCl + Na_2CO_3.NaHCO_3.2H_2O$					
3.04	1.99	23.91	3.28*	2.20*	24.1*

* Average of two results.

Cl^- CO_3^{--} Mg^{++} Na^+
$H_2O + MgCO_3 + NaCl$
$t = 23°C$ (69)

g NaCl/l	g $MgCO_3$/l
$MgCO_3$(?)	
	0.176
28.0	0.418
59.5	0.527
106.3	0.585
147.4	0.544
231.1	0.460
272.9	0.393
331.4	0.293

Cl^- CO_3^{--} Ca^{++} Na^+
$H_2O + H_2CO_3 + CaCO_3 + NaCl$
$t = 25°C$ (59)

% $CaCO_3$*	% NaCl*
$CaCO_3$	
0.147	1.427
0.151	5.375
0.162	6.076
0.156	9.943
0.148	13.646
0.133	16.380
0.094	22.992
0.076	26.369

* Liquid phase at all compositions saturated with CO_2 at 760 mm.

Cl^- CO_3^{--} Ca^{++} Na^+
$H_2O + CaCO_3 + NaCl$
$t = 25°C$ (59)

% NaCl	% $CaCO_3$
$CaCO_3$	
1.575	0.00777
4.921	0.00817
8.466	0.00860
10.296	0.00923
14.279	0.00908
18.058	0.00942
23.369	0.00912

Cl^- CO_3^{--} Ca^{++} K^+
$H_2O + CaCO_3 + KCl$
$t = 25°C$ (64)

% KCl	% $CaCO_3$
$CaCO_3$	
0.0	0.0013
3.90	0.0078
7.23	0.0078
11.10	0.0076
13.82	0.0072
15.49	0.0076
18.21	0.0070
19.84	0.0072
26.00	0.0060

Cl^- CO_3^{--} Na^+; *v. also* p. 301

% Na_2CO_3	% NaCl
$Na_2CO_3.10H_2O + NaCl$†	
17.37	15.73
$t = 30°C$ (79)	
NaCl	
0	26.28†
0	26.47
5.05	21.94
9.71	18.76
14.81	16.26
$NaCl + Na_2CO_3.H_2O$	
18.00*	14.12*
$Na_2CO_3.H_2O$	
20.72	11.49
$Na_2CO_3.7H_2O + Na_2CO_3.H_2O$	
22.75*	10.24*
$Na_2CO_3.7H_2O$	
24.26	5.93
25.59	5.17
$Na_2CO_3.10H_2O + Na_2CO_3.7H_2O$	
26.82	4.15
$Na_2CO_3.10H_2O$	
22.94†	0.0
27.12	3.33
27.48	0.90
27.98	0

* Average of two values
† At 25°C (37).

Cl^- CO_3^{--} Na^+ K^+
$H_2O + NaCl + K_2CO_3$; *v.* Fig. 53; $t = 25°C$ (37)

	Solid phases	Liquid phase—M per 1000M H_2O			
		$0.5Na_2CO_3$	$0.5K_2CO_3$	NaCl	KCl
A	$Na_2CO_3.10H_2O$	101.26			
B	$Na_2CO_3.10H_2O + NaCl$	88.20		72.40	
C	NaCl			109.8	
D	NaCl + KCl			92.08	39.32
E	KCl				89.24
F	$KCl + K_2CO_3.\frac{3}{2}H_2O$		288.32		5.0
G	$K_2CO_3.\frac{3}{2}H_2O$		295.86		
H	$NaKCO_3.6H_2O + K_2CO_3.\frac{3}{2}H_2O$	37.0	271.40		
I	$Na_2CO_3.7H_2O + NaKCO_3.6H_2O$	120.80	79.40		
J	$Na_2CO_3.7H_2O + Na_2CO_3.10H_2O$	121.0	49.40		
P	$K_2CO_3.\frac{3}{2}H_2O + NaKCO_3.6H_2O + KCl$	37.44	267.00		4.44
Q	$NaKCO_3.6H_2O + Na_2CO_3.7H_2O + KCl$	94.66	77.58	26.34	
R	$Na_2CO_3.7H_2O + Na_2CO_3.10H_2O + KCl$	91.80	67.20	32.60	
S	$Na_2CO_3.10H_2O + KCl + NaCl$	93.22		48.66	33.28

Cl^- CO_3^{--} K^+
$H_2O + KCl + K_2CO_3$
$t = 30°C$ (390)

% K_2CO_3	% KCl
$K_2CO_3.3/2H_2O$	
53.27	0
$K_2CO_3.3/2H_2O + KCl$	
52.22	1.03
KCl	
51.66	1.07
1.64	26.22
0	28.01

Cl^- $C_2O_4^{--}$ $C_2Cl_3O_2^-$ Ca^{++} K^+
$H_2O + HC_2Cl_3O_2 + CaCl_2 + K_2C_2O_4$; $t = 25°C$ (172)

g $KC_2Cl_3O_2$/l*	g CaO/l*
CaC_2O_4†	
0	0.8867
1.0074	0.8867
2.0148	0.8833
4.0296	0.8867
10.074	0.8880
20.148	0.8747
40.296	0.8760
60.4444	0.8707
80.592	0.8593
120.888	0.8273
161.184	0.7860

Cl^- $C_2O_4^{--}$ $C_2H_2ClO_2^-$ K^+
$H_2O + HC_2H_2ClO_2 + CaCl_2 + K_2C_2O_4$; $t = 25°C$ (172)

g $KC_2ClH_2O_2$/l*	g CaO/l*
CaC_2O_4†	
0	0.1027
0.6628	0.0973
1.3256	0.0880
2.6512	0.0853
5.3024	0.0840
8.6164	0.0826
26.512	0.0740

Cl^- $C_2O_4^{--}$ Th^{++++} (81, 168)
$H_2O + HCl + Th(C_2O_4$
$t = 25°C$ (168)

% HCl	% $Th(C_2O_4)_2)_2$
$3Th(C_2O_4)_2.\ ThCl_4.20H_2O$	
24.8	0.01545
37.0	0.5330
37.6	0.5395
$t = 17°C$ (81)	
$Th(C_2O_4)_2.?H_2O$	
0.0	0.0017
1.2	0.0035
3.2	0.0047‡
3.6	0.0061
4.6	0.0094
8.4	0.017
13.1	0.028
16.2	0.038
19.8	0.064

Continued on p. 303

* Liquid phase contained 18.23 g HCl per l at all compositions. † Authors do not state whether solid used was hydrated. ‡ $t = 12°C$.

$Cl^- \; CO_3^{--} \; Na^+$ (141)

$H_2O + NaCl + Na_2CO_3$; *v.* Fig. 51 and p. 300

Solid phases	Liquid phase															
	t = 0°C		t = 15°C		t = 20°C		t = 25°C		t = 30°C		t = 35°C		t = 45°C		t = 60°C	
	% Na_2CO_3	% NaCl	% Na_2CO_3	% NaCl	% Na_2CO_3	% NaCl	% Na_2CO_3	% NaCl	% Na_2CO_3	% NaCl	% Na_2CO_3	% NaCl	% Na_2CO_3	% NaCl	% Na_2CO_3	% NaCl
	6.6	0.0	14.1	0.0	17.6	0.0	22.7	0.0	28.5	0.0						
	4.3	4.5	9.9	8.9	15.5	4.0	19.6	5.6	27	3.7						
$Na_2CO_3.10H_2O$	3.7	8.2	8.7	14.7	14.1	7.7	18.8	10.8								
	3.1	12.3			12.9	12.8										
	2.8	20.4														
$Na_2CO_3.10H_2O + Na_2CO_3.7H_2O$							19.0	11.8	26.9	3.9						
							18.4	13.0	26.6	4.2	32.9	0.0				
$Na_2CO_3.7H_2O$									24.6	7.2	31.5	2.0				
									22.7	9.3						
$Na_2CO_3.7H_2O + Na_2CO_3.H_2O$									22.5	10.2	31	2.5				
									21.9	10.4	30.2	2.9	32.2	0.0	31.8	0.0
$Na_2CO_3.H_2O$									20.5	11.1	25.5	7.1	28.2	3.9	24.0	7.2
													24.4	7.3	20.2	10.9
													20.7	11.1	16.6	14.5
$Na_2CO_3.7H_2O + NaCl$									21.2m	12.9m						
$Na_2CO_3.H_2O + NaCl$									17.7	15.0	16.8	16.1	15.0	17.4	13.9	17.8
$Na_2CO_3.10H_2O + NaCl$	2.8	24.2	9.2	20.2	13.5	17.4										
	1.1	25.1	3.5	24.0	6.9	22.0	7.9	21.3	5.0	22.7	7.4	21.7	10.3	20.2		
NaCl	0.0	26.3	0.0	26.3	9.5	20.3	0.0	26.4	0.0	26.5	4.0	24.0	3.6	24.2		
					11.5	18.9					0.0	26.6	0.0	26.7	0.0	27.0
					0.0	26.4										
$Na_2CO_3.7H_2O + NaCl$							17.25*	15.45*								

Transition temperatures: $Na_2CO_3.10H_2O + Na_2CO_3.7H_2O + NaCl$ = 21°C. $Na_2CO_3.7H_2O + Na_2CO_3.H_2O + NaCl$ = 26.2°C.

* Average of two results.

$Cl^- \; CO_3^{--} \; Na^+$ (141)

$H_2O + NaOH + NaCl + Na_2CO_3$; *v.* Fig. 52 (25°)†

	Solid phases	Liquid phase											
		t = 0°C			t = 15°C			t = 20°C			t = 25°C†		
		% Na_2CO_3	% NaCl	% NaOH	% Na_2CO_3	% NaCl	% NaOH	% Na_2CO_3	% NaCl	% NaOH	% Na_2CO_3	% NaCl	% NaOH
A	$Na_2CO_3.10H_2O$	6.6			14.1			17.6			22.7		
	$Na_2CO_3.7H_2O$										18.4	13.0	
B	$Na_2CO_3.10H_2O + Na_2CO_3.7H_2O$										19.0	11.8	
C	$Na_2CO_3.7H_2O + NaCl$				7.5	12.7	10.6	12.0	15.9	3.6	17.25	15.45	
								9.6	13.4	8.5	15.9	15.0	1.7
		2.8	24.2		9.2	20.2		13.5	17.4				
	$Na_2CO_3.10H_2O + NaCl$	2.4	17.3	8.4	9.2	19.4	1.5						
		2.4	12.7	14.3	8.4	16.2	5.8						
D	NaCl		26.3			26.3			26.4			26.4	
	$NaCl + NaOH.4H_2O$		4.2	30.3									
	$NaOH.4H_2O$			29.6									
E	$NaOH.H_2O$						51.2			52.2			53.3
G	$Na_2CO_3.H_2O + Na_2CO_3$				0.6		47.3	0.3		41.5	0.5		42.5
H	$Na_2CO_3.7H_2O + Na_2CO_3.H_2O$	3.1		23.0	7.9		19.4	11.1		16.2	15.4		12.7
		3.1		22.3	8.9		17.0	12.4		13.4	18.0		9.3
I	$Na_2CO_3.7H_2O + Na_2CO_3.10H_2O$										18.1	8.6	1.7
											18.3	3.3	6.3
	$Na_2CO_3.10H_2O + NaCl + Na_2CO_3.7H_2O$	2.8	11.2	16.0	8.7	14.9	7.2	12.8	16.9	1.7			
	$Na_2CO_3.10H_2O + Na_2CO_3.7H_2O$	2.9	4.2	20.5	7.9	10.5	10.4	11.6	6.9	9.5			
					8.7	2.6	15.6	11.8	1.5	12.8			

Cl^- CO_3^{--} Na^+.—(*Continued*)

	Solid phases	Liquid phase											
		t = 0°C			t = 15°C			t = 20°C			t = 25°C†		
		% Na_2CO_3	% NaCl	% NaOH	% Na_2CO_3	% NaCl	% NaOH	% Na_2CO_3	% NaCl	% NaOH	% Na_2CO_3	% NaCl	% NaOH
	$Na_2CO_3.7H_2O + Na_2CO_3.H_2O$	3.4	4.2	22.1	8.2	9.6	13.6	10.1	7.5	12.4	14.9	6.4	8.6
					7.9	3.1	17.7	10.6	1.9	15.5	15.2	3.2	11.0
P	$Na_2CO_3.7H_2O + Na_2CO_3.H_2O + NaCl$	2.9	8.5	19.9	7.2	11.7	12.5	9.6	12.4	9.7	13.5	14.1	4.4
	$Na_2CO_3.H_2O + NaCl$	2.2	6.9	23.1	1.9	7.4	23.1	7.0	11.9	12.3	9.1	13.5	8.9
		1.9	6.5	24.0	0.2	0.9	46.2	1.2	6.6	25.1	3.1	9.9	18.5
		1.2	5.6	25.8				1.7	0.9	46.7	0.3	1.5	41.5
		0.6	4.3	29.2							0.3	1.3	44.0
Q	$Na_2CO_3.H_2O + Na_2CO_3 + NaCl$										0.5	1.1	45.7
	$Na_2CO_3 + NaCl$										0.2	1.0	49.9

Solid phases	Liquid phase											
	t = 30°C			t = 35°C			t = 45°C			t = 60°C		
	% Na_2CO_3	% NaCl	% NaOH	% Na_2CO_3	% NaCl	% NaOH	% Na_2CO_3	% NaCl	% NaOH	% Na_2CO_3	% NaCl	% NaOH
$Na_2CO_3.10H_2O$	28.5											
$Na_2CO_3.H_2O$							32.2			31.8		
$Na_2CO_3.7H_2O$	24.6	7.2		32.9								
$Na_2CO_3.10H_2O + Na_2CO_3.7H_2O$	26.9	3.9										
$Na_2CO_3.7H_2O + Na_2CO_3.H_2O$	22.05	10.2		31.0	2.5							
$Na_2CO_3.7H_2O + NaCl$	21.20	12.9										
$Na_2CO_3.H_2O + NaCl$	17.7	15.0		16.8	16.1		15.0	17.4		13.9	17.8	
NaCl		26.5			26.6			26.5			27.0	
$NaOH.H_2O$			54.3			55.4			57.8			63.5
$Na_2CO_3.H_2O + Na_2CO_3$	15.1*		35.0	0.5		39.2						
$Na_2CO_3.7H_2O + Na_2CO_3.H_2O$	21.9		7.9	32.0		0.6						
$Na_2CO_3.7H_2O + Na_2CO_3.10H_2O$	26.7		3.5									
	26.7	1.2	2.2									
$Na_2CO_3.7H_2O + Na_2CO_3.H_2O$	23.1	7.6	1.5									
	22.4	2.9	5.2									
$Na_2CO_3.H_2O + NaCl$	6.0	12.5	12.4	11.0	15.3	5.4	9.2	16.0	6.1	5.8	15.8	9.4
	0.2	3.0	34.6	4.6	11.8	14.7	2.9	10.8	18.1	2.6	11.3	18.1
				1.4	7.0	24.9	0.4	3.8	33.4	1.7	8.4	22.3
$Na_2CO_3.H_2O + Na_2CO_3 + NaCl$	0.2	1.5	41.8	0.3	1.8	40.8	0.3	2.7	37.2	0.5	4.3	33.2
$Na_2CO_3 + NaCl$	0.2	1.0	51.3	1.0	1.2	49.0	0.3	2.4	38.8	0.2	1.7	52.6
							0.2	2.1	40.9			
							0.5	1.3	54.1			

* Solution not clear. † Data for points representing systems $Na_2CO_3 + NaOH.H_2O$; $NaCl + NaOH.H_2O$; and $NaOH.H_2O + NaCl$ lacking.

Cl^- HCO_3^- Na^+ (141): $H_2O + NaCl + NaHCO_3$

Solid phases	Liquid phase															
	t = 0°C		t = 15°C		t = 20°C		t = 25°C		t = 30°C		t = 35°C		t = 45°C		t = 60°C	
	% $NaHCO_3$	% NaCl	% $NaHCO_3$	% NaCl	% $NaHCO_3$	% NaCl	% $NaHCO_3$	% NaCl	% $NaHCO_3$	% NaCl	% $NaHCO_3$	% NaCl	% $NaHCO_3$	% NaCl	% $NaHCO_3$	% NaCl
$NaHCO_3$	6.5	0.0	8.1	0.0	8.7	0.0	9.3	0.0	9.9	0.0	10.6	0.0	12.0	0.0	14.1	0.0
	2.7	8.8	3.8	8.6	4.2	8.5	3.2	12.7	4.9	8.8	4.7	10.3	5.8	10.5	7.4	10.0
	1.1	19.8	2.0	16.4	1.7	19.5	1.8	19.7	1.9	19.5	2.1	19.6	2.7	19.2	3.7	19.1
$NaHCO_3 + NaCl$	0.6	25.9	0.9	26.1	1.0	26.1	1.2	26.0	1.2	26.1	1.3	26.2	1.5	26.2	2.2	26.4
NaCl		26.3		26.3		26.4		26.4		26.5		26.6		26.7		27.0

$Cl^- \ C_2O_4^{--} \ Th^{++++}$.—(*Continued from p. 300*)

% HCl	% $Th(C_2O_4)_2$
$t = 50°C$ (81)	
$Th(C_2O_4)_2.?H_2O$	
0.0	0.0017
4.1	0.010
8.4	0.028
12.4	0.057
16.1	0.103
18.0	0.134
19.9	0.169
21.6	0.232

$Cl^- \ C_2O_4^{--} \ Sc^{+++}$ (265)

$H_2O + HCl + Sc_2(C_2O_4)_3$

M_{HCl}/l	% $Sc_2(C_2O_4)_3$ $t = 25°C$	% $Sc_2(C_2O_4)_3$ $t = 50°C$
$Sc_2(C_2O_4)_3.5H_2O$		
0.1	0.0299	0.0420
0.5	0.0650	0.0870
1.0	0.1020	0.1435
2.0	0.1716	0.2556
5.0	0.4170	0.6533

$Cl^- \ C_2O_4^{--} \ Ca^{++}$

$H_2O + H_2C_2O_4 + CaCl_2$

$t = 25°C$ (172)

g CaO/l	g HCl/l
CaC_2O_4‡	
0.004	0.0
0.314	4.559
0.5953	9.117
0.8846	13.676
1.156	18.234
1.454	22.793
1.718	27.351
2.282	36.468

$Cl^- \ C_2O_4^{--} \ Ca^{++} \ K^+$

$H_2O + HCl + CaCl_2 + K_2C_2O_4$

$t = 25°C$ (172)

g KCl/l*	g CaO/l*
CaC_2O_4†	
0	1.1666
0.3728	1.1706
0.7456	1.174
1.4912	1.1833
3.728	1.194
7.456	1.221
14.912	1.2686
22.368	1.3093
37.280	1.396

$Cl^- \ C_2O_4^{--} \ Na^+$ (82)

$H_2O + NaCl + Na_2C_2O_4$

°C	% NaCl	% $Na_2C_2O_4$
$NaCl + Na_2C_2O_4$		
15	26.28	0.027
50	26.64	0.063

$Cl^- \ C_2O_4^{--} \ K^+$ (82, 385)

$H_2O + KCl + K_2C_2O_4$

°C (82)	% KCl	% $K_2C_2O_4$
$KCl + K_2C_2O_4.H_2O$		
15	19.19	10.03
50	20.26	15.18

$t = 20°C$ (385)

% KCl	% $K_2C_2O_4$
KCl	
34.41	0.0
32.05	6.03
29.31	13.11
$KCl + K_2C_2O_4.H_2O$	
28.56	15.08
$K_2C_2O_4.H_2O$	
21.49	18.81
13.67	23.92
5.70	29.98
0.0	34.93

$Cl^- \ C_2H_3O_2^- \ C_4H_4O_6^{--} \ Ca^{++} \ K^+$

$H_2O + HCl + Ca(C_2H_3O_2)_2 + K_2C_4H_4O_6$

$t = 25°C$ (172)

g KCl/l	g CaO/l
$CaC_4H_4O_6$†	
0.0	0.4733
0.3728	0.4860
0.7456	0.4926
1.4912	0.5206
3.7280	0.5600
7.456	0.6140
14.912	0.7120
22.368	0.8706
29.824	1.0746

v. also $C_2H_3O_2^- \ C_4H_4O_6^{--} \ Ca^{++} \ K^+$, p. 374

$Cl^- \ C_4H_4O_6^{--} \ C_2H_2ClO_2^- \ Ca^{++} \ K^+$

$H_2O + HC_2H_2ClO_2 + CaCl_2 + K_2C_4H_4O_6$

$t = 25°C$ (172)

g $KC_2ClH_2O_2$/l	g CaO/l
$CaC_4H_4O_6$†	
0	3.695
1.3256	3.623
2.6512	3.586
5.3024	3.477
13.256	3.263
19.884	3.093
26.512	3.001

$Cl^- \ HC_4H_4O_6^- \ Na^+ \ K^+$

$H_2O + NaCl + KHC_4H_4O_6$

$t = 25°C$ (283)

M_{NaCl}/l	$M_{KHC_4H_4O_6}/l$
$KHC_4H_4O_6$	
0	0.0347
0.05	0.03761
0.10	0.03974
0.20	0.04276

* Liquid phase contained 18.23 g HCl per l at all compositions.

† Authors do not state whether solid used was hydrated.

‡ Authors do not give actual composition of solid used.

$Cl^- \ HC_4H_4O_6^- \ K^+$

$H_2O + HCl + KHC_4H_4O_6$

$t = 25°C$ (283)

M_{HCl}/l	$M_{KHC_4H_4O_6}/l$
$KHC_4H_4O_6$	
0.0	0.0347
0.0125	0.03667
0.025	0.04282
0.050	0.05887

$Cl^- \ HC_4H_4O_6^- \ K^+$ (48, 283)

$H_2O + KCl + KHC_4H_4O_6$

$t = 22°C$ (48)

M/1000g H_2O

KCl	$KHC_4H_4O_6$
$KHC_4H_4O_6$	
0.0	0.03057
0.01	0.02634
0.02	0.02281
0.035	0.01890
0.05	0.01580
0.10	0.01078
0.2	0.00705
0.35	0.00488
0.50	0.00397
1.00	0.00269
2.0	0.00189
dl-$KHC_4H_4O_6$	
0.0	0.02822
0.01	0.02392
0.02	0.02045
0.035	0.01676
0.05	0.01405
0.10	0.00939
0.20	0.00604
0.35	0.00424
0.50	0.00340
1.00	0.00233
2.00	0.00164

$Cl^- \ HC_4H_4O_6^- \ K^+$.—(*Cont'd*)

M/1000g H_2O

KCl	$KHC_4H_4O_6$
$t = 25°C$ (283)*	
$KHC_4H_4O_6$	
0	0.0347
0.025	0.02544
0.050	0.01955
0.100	0.01333
0.200	0.00869

* All values are mean of two results

$Cl^- \ C_6H_5(NH_3)^- \ Fe^{+++}$

$H_2O + HCl + C_6H_5(NH_2)$-$HCl + FeCl_3$

$t = 25°C$ (291)

% C_6H_5-(NH_2)-HCl	% $FeCl_3$	% HCl
$C_6H_5(NH_2)HCl$		
22.78	0.0	11.08
$6C_6H_5(NH_2)HCl.FeCl_3$		
20.24	1.29	11.78
17.17	2.82	11.88
13.81	5.18	11.32
7.06	12.12	11.44
5.29	16.06	11.69
4.49	18.16	11.91
3.96	19.95	11.49
$6C_6H_5(NH_2)HCl.FeCl_3 + 2C_6H_5(NH_2)HCl.FeCl_3$		
3.57	21.50	12.89
$2C_6H_5(NH_2)HCl.FeCl_3$		
2.58	23.36	12.96
2.10	25.59	12.48
1.71	28.61	11.71
1.35	33.10	10.98

$Cl^- \ C_{10}H_7SO_3^- \ Na^+$ (85)

$H_2O + NaCl + \beta$-$C_{10}H_7SO_3Na$

$t = 25°C$		$t = 30°C$		$t = 40°C$		$t = 50°C$		$t = 65°C$	
% β-salt	% NaCl	% β-salt	% NaCl	% β-salt	% NaCl	% β-salt	% NaCl	% β-salt	% NaCl
β-$C_{10}H_7SO_3Na$									
5.85	0.0	6.24	0.0	7.98	0.0	9.75	0.0	14.6	6
3.46	2.38	1.21	4.84	1.46	5.62	4.15	2.9	8.47	2.93
0.31	9.19	0.16	13.08	0.65	8.47	2.17	5.42	6.12	3.81
0.15	13.16	0.0	26.5	0.0	26.7	1.05	8.39	1.96	7.19
0.0	16.81					0.0	26.8	1.26	10.83
0.0	26.43							0.0	27.21

$Cl^- \ Sn^{++}$

$H_2O + HCl + SnCl_2$

$t = 0°C$ (119)

M ½$SnCl_2$/l	M_{HCl}/l
(?)*	
7.4	0
6.67	0.66
6.375	1.354
6.840	2.480
8.120	3.49
9.42	4.00
11.76	4.40
14.76	4.94
15.64	6.60
15.70	7.80

* Composition of solid phases not determined.

$Cl^- \ Sn^{++} \ K^+$

$H_2O + SnCl_2 + KCl$

$t = 25°C$ (143)

g per 100g H_2O

KCl	$SnCl_2$
$SnCl_2.2H_2O$	
0.0	234.05
2.73	222.55
7.49	235.50
19.66	290.30
$SnCl_2.KCl.H_2O$	
25.51	337.20
24.38	247.50
21.26	170.70
17.79	107.65
19.06	81.78
17.85	58.48
19.45	54.19

Cl^- Sn^{++} K^+.—(*Continued*)

g per 100g H_2O

KCl	$SnCl_2$
$SnCl_2.2KCl.2H_2O$	
5.99	34.28
24.40	27.88
24.68	17.42
27.30	10.24
30.65	5.83
31.76	5.95
KCl	
34.08	4.37
32.17	2.86
34.73	0.0

Cl^- Pb^{++}

$H_2O + HCl + PbCl_2$

$t = 25.2°C$ (117)

M_{HCl}/l	M $\frac{1}{2}PbCl_2/l$
$PbCl_2$	
0.0	0.0388
0.001	0.0386
0.0025	0.03806
0.005	0.03714
0.010	0.03545
0.020	0.03213
0.060	0.02281
0.100	0.01647
0.250	0.00889
0.500	0.00546
0.700	0.00483
1.000	0.00445
1.500	0.00462
2.000	0.00512
3.000	0.00754

Cl^- Pb^{++} Ca^{++}

$H_2O + PbCl_2 + CaCl_2$

$t = 25°C$ (181)

M $\frac{1}{2}CaCl_2/l$	M $\frac{1}{2}PbCl_2/l$
$PbCl_2$	
0.00	0.07790
0.52	0.01392
0.95	0.01126
1.91	0.01542
3.03	0.02436
4.12	0.04114

Cl^- Pb^{++} Sr^{++}

$H_2O + PbCl_2 + SrCl_2$

$t = 25°C$ (181)

M $\frac{1}{2}SrCl_2/l$	M $\frac{1}{2}PbCl_2/l$
$PbCl_2$	
0.00	0.07790
0.051	0.01356
1.02	0.01280
1.38	0.01648
2.66	0.02836
3.09	0.03156
4.13	0.05396

Cl^- Pb^{++} Ba^{++}

$H_2O + PbCl_2 + BaCl_2$

$t = 25°C$ (181)

M $\frac{1}{2}BaCl_2/l$	M $\frac{1}{2}PbCl_2/l$
$PbCl_2$	
0.00	0.07790
0.32	0.01398
0.64	0.01106

Cl^- Pb^{++} Ba^{++}.—(*Continued*)

M $\frac{1}{2}BaCl_2/l$	M $\frac{1}{2}PbCl_2/l$
$PbCl_2$	
1.38	0.02178
2.08	0.04776

Cl^- Pb^{++} Na^+

$H_2O + PbCl_2 + NaCl$

$t = 25°C$ (181)

M_{NaCl}/l	M $\frac{1}{2}PbCl_2/l$
$PbCl_2$	
0.0	0.07790
0.051	0.01289
1.02	0.01262
2.05	0.01922
3.03	0.02558
4.10	0.08754

Cl^- Pb^{++} K^+; *cf. also* (51.1)

$H_2O + PbCl_2 + KCl$

$t = 20°C$ (47); *v.* Fig. 54

% $PbCl_2$	% KCl
$KCl + PbCl_2.KCl.\frac{1}{3}H_2O$	
0.289	25.34
$PbCl_2.KCl.\frac{1}{3}H_2O$	
0.247	23.71
0.215	21.69
0.194	19.83
$PbCl_2.KCl.\frac{1}{3}H_2O + 2PbCl_2.KCl$	
0.183	18.26
$2PbCl_2.KCl$	
0.158	16.70
0.124	14.04
0.106	10.47
0.103	9.12
0.107	6.93
0.149	4.28
$2PbCl_2.KCl + PbCl_2$	
0.174	3.79
$PbCl_2$	
0.184	2.79
0.202	2.23
0.264	1.45

Solid phases* (102)

A	$PbCl_2$
B	$PbCl_2 + 2PbCl_2.KCl$
C	$2PbCl_2.KCl + 3PbCl_2.3KCl.H_2O$
D	$3PbCl_2.3KCl.H_2O + KCl$

* No numerical data given for liquid phase; diagram (Fig. 54) shows grams of $PbCl_2$ and KCl per 100 g of solution.

Cl^- Tl^{+++} Cs^+

$H_2O + TlCl_3 + CsCl$

$t = 15°C$ (253)

% $TlCl_3$*	% $TlCl_3$*
$TlCl_3.4H_2O$	
65.178	
$TlCl_3.4H_2O + 2TlCl_3.3CsCl$	
65.181	
$2TlCl_3.3CsCl$	
61.18	23.813
50.127	10.210
40.970	1.451
31.705	0.017

* Concentration of CsCl not appreciable.

Cl^- Tl^{+++} Cs^+.—(*Continued*)

% CsCl†	% CsCl†
$2TlCl_3.3CsCl + TlCl_3.2CsCl.2H_2O$	
	3.275
$TlCl_3.3CsCl.2H_2O$	
3.272	22.781
8.313	26.930
15.781	
$TlCl_3.2CsCl.2H_2O + TlCl_3.3CsCl.H_2O$	
	27.200
$TlCl_3.3CsCl.H_2O$	
27.689	39.913
32.721	45.126
$TlCl_3.3CsCl.H_2O + TlCl_3.3CsCl$	
	45.227
$TlCl_3.3CsCl$	
45.910	58.170
50.000	63.981
$TlCl_3.3CsCl + CsCl$	
	64.713
CsCl	
	64.750

† Concentration of $TlCl_3$ not appreciable.

Cl^- Zn^{++}

$H_2O + ZnO + ZnCl_2$

t = room (109)

g per 100g H_2O

$ZnCl_2$	ZnO
ZnO	
8.22	0.0137
23.24	0.138
45.95	0.497

Cl^- Zn^{++}.—(*Continued*)

g per 100g H_2O

$ZnCl_2$	ZnO
ZnO	
51.50	0.604
56.90	0.723
62.85	0.884
96.00	1.792
124.70	3.213
144.80	2.64
203.00	1.59

Cl^- Zn^{++} K^+

$H_2O + ZnCl_2 + KCl$

$t = 25°C$ (247)

% KCl	% $ZnCl_2$
$ZnCl_2$	
0.0	82.0
$ZnCl_2 + 2KCl.ZnCl_2.6H_2O$	
0.75	74.0
$2KCl.ZnCl_2.6H_2O$	
1.50	67.5
2.00	66.5
3.33	64.0
8.25	57.5
18.75	46.8
25.75	41.0
31.00	38.0
$KCl + 2KCl.ZnCl_2.6H_2O$	
33.50	36.5
KCl	
35.00	35.5
36.50	35.0
33.75	31.75
29.00	21.50
26.50	0.0

Cl^- Cd^{++} Na^+ (371)

$H_2O + CdCl_2 + NaCl$; *v.* Fig. 55

Solid phases	Liquid phase—g per 100g H_2O							
	$t = 19.3°C$		$t = 29.7°C$		$t = 40.1°C$		$t = 54.4°C$	
	$CdCl_2$	NaCl	$CdCl_2$	NaCl	$CdCl_2$	NaCl	$CdCl_2$	NaCl
$CdCl_2.\frac{5}{2}H_2O$	111.30		129.65	0.0				
$CdCl_2.H_2O$					133.85	0.0	133.9	0.0
$CdCl_2.\frac{5}{2}H_2O + CdCl_2.2NaCl.3H_2O$	116.64	7.52	132.67	9.63				
$CdCl_2.H_2O + CdCl_2.2NaCl.3H_2O$					137.03	15.14	140.42	19.10
$CdCl_2.2NaCl.3H_2O$	85.15	12.19	123.54	10.10	48.17	29.50	52.76	32.97
	40.01	25.67	106.16	12.92				
			91.10	15.41				
			43.74	27.46				
$CdCl_2.2NaCl.3H_2O + NaCl$	5.96	36.76	9.43	37.54	13.31	38.16	22.53	39.07
NaCl	0.0	35.84	0.0	35.88	0.0	36.18	0.0	36.82

Transition points

$CdCl_2.\frac{5}{2}H_2O + CdCl_2.H_2O$ + solution = 33°C.

$CdCl_2.\frac{5}{2}H_2O + CdCl_2.H_2O + CdCl_2.2NaCl.3H_2O$ + solution = 32.5°C.

Cl^- Cd^{++} K^+ (371): $H_2O + CdCl_2 + KCl$; *v.* Fig. 56

Solid phases	Liquid phase—g per 100g H_2O							
	$t = 19.3°C$		$t = 29.7°C$		$t = 40.1°C$		$t = 54.5°C$	
	$CdCl_2$	KCl	$CdCl_2$	KCl	$CdCl_2$	KCl	$CdCl_2$	KCl
$CdCl_2.\frac{5}{2}H_2O$	111.30	0.0	129.65	0.0				
			97.62	0.70				
$CdCl_2.H_2O$					133.85	0.0	133.90	0.0
$CdCl_2.\frac{5}{2}H_2O + CdCl_2.KCl.H_2O$	59.59	6.70	68.23	7.08				
$CdCl_2.H_2O + CdCl_2.KCl.H_2O$					92.15	2.70	102.15	2.32

$Cl^- Cd^{++} K^+$.—(*Continued*)

Solid phases	Liquid phase—g per 100g H_2O							
	t = 19.3°C		t = 29.7°C		t = 40.1°C		t = 54.5°C	
	$CdCl_2$	KCl	$CdCl_2$	KCl	$CdCl_2$	KCl	$CdCl_2$	KCl
$CdCl_2.KCl.H_2O$......	26.98	11.09	47.12	9.89	51.90	11.50	44.01	18.39
			32.67	13.06	37.91	15.21		
			24.26	16.10	24.45	21.73		
			15.99	25.97	18.97	35.51		
$CdCl_2.KCl.H_2O$ + $CdCl_2.4KCl$.........	11.61	30.04	15.47	33.58	19.92	37.63	26.13	43.78
$CdCl_2.4KCl$ + KCl....	1.44	34.76	2.42	37.66	2.98	40.45	4.20	45.52
KCl..................	0.0	33.94	0.0	37.21	0.0	40.36	0.0	43.00

Transition points

$CdCl_2.\frac{5}{2}H_2O + CdCl_2.H_2O$ + solution = 33°C.

$CdCl_2.\frac{5}{2}H_2O + CdCl_2.H_2O + CdCl_2.KCl.H_2O$ + solution = 33.5°C.

$Cl^- Hg^{++}$

$H_2O + HCl + HgCl_2$

t = 0°C (119)

M $\frac{1}{2}HgCl_2$/l	M_{HCl}/l
(?)*	
0.97	0.43
1.98	0.99
3.55	1.78
5.56	2.69
6.89	3.225
7.2375	3.425
8.55	4.15
8.865	4.81
9.568	7.088

* Composition of solid phase not determined.

$Cl^- Hg^{++}$

$H_2O + HgO + HgCl_2$

t = 25°C (382)

% $HgCl_2$	% HgO
$HgCl_2$	
8.58	0.0
Solid soln. I *	
8.72	0.14
8.68	0.07
$HgCl_2.2HgO$	
8.69	0.10
4.39	0.09
0.66	0.02
$HgCl_2.2HgO + HgCl_2.4HgO$	
0.66	0.02
$HgCl_2.4HgO$	
0.61	0.02
0.20	0.06
Solid soln. II †	
0.13	0.04
0.05	0.04
HgO	
0.04	0.04
0.0	0.001

* Solid soln. I = $HgCl_2$ + $HgCl_2$.-2HgO.

† Solid soln. II = $HgCl_2.4HgO$ + $HgCl_2$.

$Cl^- Hg^{++} Cu^{++}$

$H_2O + HgCl_2 + CuCl_2$

t = 35°C (359)

% $CuCl_2$	% $HgCl_2$
$CuCl_2.2H_2O$	
44.47	0
33.50	21.03
26.07	37.3
23.31	44.47

$Cl^- Hg^{++} Cu^{++}$.—(*Continued*)

% $CuCl_2$	% $HgCl_2$
$CuCl_2.2H_2O + HgCl_2$	
21.50*	50.47*
$HgCl_2$	
19.40	52.44
18.48	52.54
18.06	52.81
14.73	51.03
5.94	49.50
2.64	23.87
0	8.51

* Mean of several determinations.

$Cl^- Hg^{++} Mg^{++}$

$H_2O + HgCl_2 + MgCl_2$

t = 25°C (182)

M_{MgCl_2}/l	M_{HgCl_2}/l
(?)‡	
0	0.265
0.168	0.374
0.415	0.719
0.570	1.131
0.997	1.864
1.320	2.569
1.728	3.206

$Cl^- Hg^{++} Ca^{++}$

$H_2O + HgCl_2 + CaCl_2$

t = 25°C (182)

M_{CaCl_2}/l	M_{HgCl_2}/l
(?)‡	
0	0.265
0.190	0.364
0.402	0.766
0.656	1.108
0.964	1.811
1.429	2.645
1.723	3.304

$Cl^- Hg^{++} Sr^{++}$

$H_2O + HgCl_2 + SrCl_2$

t = 25°C (182)

M_{HgCl_2}/l	M_{SrCl_2}/l
(?)‡	
0.265	0
0.315	0.164
0.563	0.311
0.829	0.519
1.342	0.724
1.776	1.046
2.293	1.386

‡ Composition of solid phase not determined; probably $HgCl_2$.

$Cl^- Hg^{++} Ba^{++}$ (341): $H_2O + HgCl_2 + BaCl_2$; *v.* Fig. 57

	t = 0°C		t = 30°C	
	% $BaCl_2$	% $HgCl_2$	% $BaCl_2$	% $HgCl_2$
$BaCl_2.2H_2O$				
A	23.70	0.0	27.77	0.0
	24.00	14.25	27.47	7.09
	24.89	36.20	26.89	22.61
			25.22	46.50
$BaCl_2.2H_2O + HgCl_2$				
B			23.18*	55.22*
$BaCl_2.3HgCl_2.6H_2O + BaCl_2$.-$2H_2O$				
C	24.05*	46.08*		

	t = 0°C		t = 30°C	
	% $BaCl_2$	% $HgCl_2$	% $BaCl_2$	% $HgCl_2$
$BaCl_2.3HgCl_2.6H_2O$				
	23.28	46.59		
	21.05	47.78		
$BaCl_2.3HgCl_2.6H_2O + HgCl_2$				
D	20.68*	48.46*		
$HgCl_2$				
	18.50	44.33	17.87	48.97
	11.59	29.00	14.26	41.30
	6.11	16.36	8.41	27.62
	0.0	3.95	2.65	14.18
E			0.0	7.67

°C (137)	Solid phases	Liquid phase	
		% $BaCl_2$	% $HgCl_2$
10.4	$BaCl_2.2H_2O + BaCl_2.3HgCl_2.6H_2O$	23.6	50.5
10.4	$HgCl_2 + BaCl_2.3HgCl_2.6H_2O$......	21.6	51.9
25	$BaCl_2.2H_2O + HgCl_2$............	23.00	54.8
40	$BaCl_2.2H_2O + HgCl_2$............	22.98	56.57
17.2	$BaCl_2.3HgCl_2.6H_2O + BaCl_2.2H_2O + HgCl_2$†......................		

* Average of several determinations. † Invariant point.

$Cl^- Hg^{++} Li^+$

$H_2O + HgCl_2 + LiCl$

t = 25°C (182)

M_{LiCl}/l	M_{HgCl_2}/l
(?)‡	
0	0.265
0.414	0.351
0.835	0.666
1.271	1.021
1.738	1.678
2.265	2.214
3.091	2.896
3.527	3.062

$Cl^- Hg^{++} Na^+$

$H_2O + HgCl_2 + NaCl$

t = 25°C (182)

M_{HgCl_2}/l	M_{NaCl}/l
(?)‡	
0.265	0
0.372	0.212
0.508	0.416
0.748	0.671
1.192	1.153
2.022	1.941
2.754	2.783
3.434	3.162

$Cl^- Cu^+$

$H_2O + HCl + CuCl$

t = 25°C (282)

M per 1000g H_2O

HCl	CuCl
CuCl (?)	
1.1650	0.1165
0.31652	0.01988
0.2156	0.01340
0.09784	0.00596

‡ Composition of solid phase not determined; probably $HgCl_2$.

$Cl^- Cu^+ Cu^{++}$

$H_2O + HCl + CuCl + CuCl_2$

t = 25°C (299)

M_{CuCl}/l	M_{CuCl_2}/l
CuCl	
0.0862*	0.0*
0.1016*	0.1001*
0.1254*	0.2002*
0.1449*	0.3003*
0.1703*	0.4004*
0.1919*	0.5005*
0.2365†	0.0†
0.2588†	0.0940†
0.2750†	0.1410†
0.2886†	0.1880†
0.3035†	0.2350†
0.3218†	0.2820†
0.7714‡	0.0‡
0.7884‡	0.0473‡
0.8098‡	0.0946‡
0.8281‡	0.1420‡
0.8476‡	0.1894‡
0.8673‡	0.2367‡
0.9252‡	0.3788‡
0.9439‡	0.4261‡
0.9646‡	0.4734‡

* Liquid phase contained per l: 1M HCl.

† 2M HCl.

‡ 4M HCl.

$Cl^- Cu^+ Fe^{++}$

$H_2O + CuCl + FeCl_2$

t = 21.5°C (236)

g per 100g H_2O

CuCl	$FeCl_2$
CuCl	
1.53*	0.0
1.33	6.02*
1.81	11.62

Cl^- Cu^+ Fe^{++}.—(*Continued*)

g per 100g H_2O

CuCl	$FeCl_2$
CuCl	
3.11	16.3
7.13	26.31
8.06	29.35
9.56	33.12
12.44	43.75
17.04	54.00
21.60	66.40
$CuCl + FeCl_2.4H_2O$	
23.30	73.20
$FeCl_2.4H_2O$	
21.66	71.89
11.90	69.34
0.0	65.10

Transition point, $FeCl_2.4H_2O + FeCl_2.2H_2O$ + solution = 65.2°C.

* Most of the figures here given represent the average of two determinations.

Cl^- Cu^+ Na^+

$H_2O + CuCl + NaCl$

t = 26.5°C (236)

g per 100g H_2O

CuCl	NaCl
CuCl	
1.56	0.0
3.15	10.80
7.30	20.70
40.60	27.00
49.10	36.48
CuCl + NaCl	
57.21	44.14
NaCl	
41.10	55.10
41.70	56.80
18.70	50.90

Cl^- Cu^+ K^+

$H_2O + CuCl + KCl$

t = 22°C (47)

% CuCl	% KCl
CuCl	
0.405	6.560
1.370	9.840
4.840	15.30
10.430	20.27
13.32	21.64
CuCl + CuCl.2KCl	
21.46*	25.11*
CuCl.2KCl	
15.48	23.87
13.99	23.57
14.44	23.76
11.39	23.50
7.35	23.49
4.53	24.04
3.14	25.03
2.20	26.28
CuCl.2KCl + KCl	
1.76*	27.03*
KCl	
0.58	26.32
0.0	25.68

* Mean of several results.

Cl^- Cu^+ K^+.—(*Continued*)

t = 25°C (388)

M % KCl	M % CuCl
KCl	
8.0	0.0
1.49	0.20
0.90	0.23
0.85	0.25
KCl + 2KCl.CuCl	
0.75	0.25
2KCl.CuCl	
0.75	0.30
0.80	0.40
0.85	0.52
1.05	0.80
1.15	0.90
1.22	1.00
1.35	1.10
1.50	1.25
1.55	1.25
$2KCl.CuCl + KCl.CuCl.H_2O$	
1.62	1.32
$KCl.CuCl.H_2O$	
1.45	1.44
1.25	1.55
1.24	1.65
1.20	1.66
1.15	1.75
1.10	1.80
1.05	1.85
1.00	1.90
0.95	1.97
0.90	2.05
CuCl	
0.62	2.10
0.54	1.91
0.25	0.96
0.18	0 68
0.09	0.27

Cl^- Cu^{++} (136)

$H_2O + HCl + CuCl_2$

t = 0°C

% $CuCl_2$	% HCl
$CuCl_2.2H_2O$	
40.92	0.0
34.82	3.72
23.82	10.35
15.64	16.71
12.12	21.82
11.92	25.64
13.86	29.02
$CuCl_2.2H_2O + CuCl_2.HCl.$-$3H_2O$	
17.42	31.16
$CuCl_2.HCl.3H_2O$	
15.66	32.66
14.13	34.55
12.29	36.82
11.85	37.19
t = 25°C	
$CuCl_2.2H_2O$	
43.32	0.0
32.85	6.52
23.74	12.95
18.34	18.08
17.71	19.92

Cl^- Cu^{++}.—(*Continued*)

% $CuCl_2$	% HCl
$CuCl_2.2H_2O$	
17.01	22.26
18.20	25.07
22.65	27.76
23.29	27.94
24.07	28.05
25.65	28.49

Cl^- Cu^{++} Sr^{++}

$H_2O + CuCl_2 + SrCl_2$

t = 25°C (161)

M per 1000g H_2O

$0.5CuCl_2$	$0.5SrCl_2$
$SrCl_2.6H_2O$	
0.0	7.034
0.7134	6.812
2.276	6.352

Cl^- Cu^{++} Ba^{++} (347, 350)

$H_2O + CuCl_2 + BaCl_2$

t = 30°C

% $BaCl_2$	% $CuCl_2$
$BaCl_2.2H_2O$	
26.70	0.0
17.08	11.49
5.49	30.76
$BaCl_2.2H_2O + CuCl_2.2H_2O$	
2.72	42.36
$CuCl_2.2H_2O$	
1.25	42.45
0.0	43.95
t = 40°C	
$BaCl_2.2H_2O$	
28.98	0.0
$BaCl_2.2H_2O + CuCl_2.2H_2O$	
3.72	42.72
$CuCl_2.2H_2O$	
0.0	44.67

Cl^- Cu^{++} Ba^{++}.—(*Continued*)

% $BaCl_2$	% $CuCl_2$
t = 60°C	
$BaCl_2.2H_2O$	
31.70	0.0
$BaCl_2.2H_2O + CuCl_2.2H_2O$	
6.87	43.57
$CuCl_2.2H_2O$	
0.0	47.42

Cl^- Cu^{++} Ba^{++} Na^+; *see below*

Cl^- Cu^{++} Li^+

$H_2O + CuCl_2 + LiCl$

t = 30°C (358)

% $CuCl_2$	% LiCl
$CuCl_2.2H_2O$	
43.40	0
40.20	2.50
39.5	2.90
34.9	6.20
27.9	11.80
24.2	13.80
22.7	16.30
20.7	19.0
$CuCl_2.2H_2O + CuCl_2.LiCl.$-$2H_2O$	
19.6	22.2
$CuCl_2.LiCl.2H_2O$	
16.2	28.6
13.6	29.70
7.3	36.30
4.4	40.3
2.7	42.8
$CuCl_2.LiCl.2H_2O + LiCl.H_2O$	
1.8	45.4
$LiCl.H_2O$	
1.7	45.5
0	46.3

Cl^- Cu^{++} Ba^{++} Na^+: $H_2O + CuCl_2 + BaCl_2 + NaCl$; *v.* Fig. 58

t = 30°C (347)

	Solid phases	Liquid phase % $BaCl_2$	Liquid phase % $CuCl_2$	Liquid phase % NaCl
A	$BaCl_2.2H_2O$	26.70		
B	$BaCl_2.2H_2O + NaCl$	3.80		23.74
C	NaCl			26.47
D	$NaCl + CuCl_2.2H_2O$		36.86	10.25
E	$CuCl_2.2H_2O$		43.95	
F	$CuCl_2.2H_2O + BaCl_2.2H_2O$	2.72	42.36	
P	$BaCl_2.2H_2O + CuCl_2.2H_2O + NaCl$	1.97	36.12	10.49

Cl^- Cu^{++} Ba^{++} K^+; *v.* p. 307

Cl^- Cu^{++} Na^+ (345, 347): $H_2O + CuCl_2 + NaCl$

Solid phases	Liquid phase—g per 100g H_2O							
	t = 15°C (345)		t = 25°C (345)		t = 35°C (345)		t = 30°C (347)	
	$CuCl_2$	NaCl	$CuCl_2$	NaCl	$CuCl_2$	NaCl	$CuCl_2$	NaCl
$CuCl_2.2H_2O$	73.30		76.66		80.17		43.95	
							41.06	4.28

Continued on page 307

Cl^- Cu^{++} Ba^{++} K^+ (350): $H_2O + CuCl_2 + BaCl_2 + KCl$; *v.* Fig. 59

	Solid phases	Liquid phase—g per 100g of dissolved salts							
		t = 40°C				t = 60°C; *v.* Fig. 59			
		$BaCl_2$	$CuCl_2$	KCl	H_2O	$BaCl_2$	$CuCl_2$	KCl	H_2O
	$BaCl_2.2H_2O$	100			245.00	100.00			215.5
A	$BaCl_2.2H_2O + CuCl_2.2H_2O$	8.01	91.99		115.3	13.62	86.38		98.25
	$CuCl_2.2H_2O$		100.00		123.9		100.00		110.9
B	$CuCl_2.2H_2O + CuCl_2.KCl$						77.24	22.76	66.47
C	$CuCl_2.KCl + CuCl_2.2KCl.2H_2O$						71.73	28.27	65.07
	$CuCl_2.2H_2O + CuCl_2.2KCl.2H_2O$		81.74	18.26	86.5				
D	$CuCl_2.2KCl.2H_2O + KCl$		51.50	48.50	125.30		50.43	49.57	89.79
	KCl			100.00	249.3			100.00	220.5
E	$KCl + BaCl_2.2H_2O$	27.62		72.38	201.8	39.11		60.89	163.7
P	$KCl + BaCl_2.2H_2O + CuCl_2.2KCl.2H_2O$	11.62	44.04	44.34	115.14	10.98	45.27	43.75	83.96
Q	$BaCl_2.2H_2O + CuCl_2.2KCl.2H_2O + CuCl_2.KCl$					7.74	66.58	25.67	63.02
R	$BaCl_2.2H_2O + CuCl_2.KCl + CuCl_2.2H_2O$					8.03	71.72	20.25	62.68
	$BaCl_2.2H_2O + CuCl_2.2H_2O + CuCl_2.2KCl.2H_2O$	5.44	76.57	17.99	82.01				

Cl^- Cu^{++} Na^+.—*(Continued from p. 306)*

Solid phases	Liquid phase—g per 100g H_2O							
	t = 15°C (345)		t = 25°C (345)		t = 35°C (345)		t = 30°C (347)	
	$CuCl_2$	NaCl	$CuCl_2$	NaCl	$CuCl_2$	NaCl	$CuCl_2$	NaCl
$CuCl_2.2H_2O$ + NaCl	65.84	18.69	68.77	20.38	73.59	21.35	36.86	10.25
NaCl		35.77		36.25		36.20	32.40	12.25
							16.98	18.44
								26.47

Cl^- Cu^{++} K^+ (267, 350): $H_2O + CuCl_2 + KCl$

°C	Solid phases (267)	Liquid phase % $CuCl_2$	Liquid phase % KCl
39.4	$CuCl_2.2KCl.2H_2O + KCl$	22.75	22.49
49.9	$CuCl_2.2KCl.2H_2O + KCl$	24.46	24.17
60.4	$CuCl_2.2KCl.2H_2O + KCl$	26.93	26.27
79.1	$CuCl_2.2KCl.2H_2O + KCl$	31.86	29.85
90.5	$CuCl_2.2KCl.2H_2O + KCl$	35.64	32.37
93.7	$CuCl_2.KCl + KCl$	36.79	32.79
98.8	$CuCl_2.KCl + KCl$	37.36	34.05
0	$CuCl_2.2KCl.2H_2O + CuCl_2.2H_2O$	40.59	4.41
39.6	$CuCl_2.2KCl.2H_2O + CuCl_2.2H_2O$	44.00	10.30
50.1	$CuCl_2.2KCl.2H_2O + CuCl_2.2H_2O$	44.18	12.40
52.9	$CuCl_2.2KCl.2H_2O + CuCl_2.2H_2O$	45.71	13.03
60.2	$CuCl_2.KCl + CuCl_2.2H_2O$	46.65	13.87
72.60	$CuCl_2.KCl + CuCl_2.2H_2O$	48.38	13.24
64.2	$CuCl_2.2KCl.2H_2O + CuCl_2.KCl$	42.93	18.53
72.5	$CuCl_2.KCl$	40.54	22.78
92.3 *ca.*	$CuCl_2.2KCl.2H_2O + CuCl_2.KCl + KCl$		
55.1 *ca.*	$CuCl_2.2KCl.2H_2O + CuCl_2.KCl + CuCl_2.2H_2O$		

Solid phases (350)	Liquid phase t = 40°C		Liquid phase t = 60°C	
	% $CuCl_2$	% KCl	% $CuCl_2$	% KCl
$CuCl_2.2H_2O$	44.67		47.42	
$CuCl_2.2H_2O + CuCl_2.2KCl.2H_2O$	43.83	9.79		
$CuCl_2.2KCl.2H_2O + KCl$	22.85	21.53	26.57	26.12
KCl		28.63		31.20
$CuCl_2.2H_2O + CuCl_2.KCl$			46.4	13.67
$CuCl_2.KCl + CuCl_2.2KCl.2H_2O$			43.45	17.13

Cl^- Mn^{++} Co^{++}: $H_2O + MnCl_2 + CoCl_2$; *v.* Fig. 60
t = 15–20°C (366)

Solid phases M% $MnCl_2$.-$6H_2O$ or $MnCl_2.4H_2O$	Liquid phase M% $MnCl_2$ in salts ($MnCl_2$, $CoCl_2$)	Solid phases M % $MnCl_2$.-$6H_2O$ or $MnCl_2.4H_2O$	Liquid phase M % $MnCl_2$ in salts ($MnCl_2$, $CoCl_2$)
Solid soln. I*		Solid soln. II†	
		50.4	75.0
7.3	20.0	73.5	63.6
15.4	33.3	74.1	66.7
16.8	42.9	81.5	75.0
21.8	50.0	86.5	83.3
31.4	57.1	91.4	90.9
37.1	66.7	92.1	91.7

* Solid soln. I, red, contains from 0 to 37M % $MnCl_2.6H_2O$. † Solid soln. II, violet, contains from 74.5 to 100M % $MnCl_2.4H_2O$. The solution saturated with the two saturated mixed crystals contained approximately 6.3M % $MnCl_2$, 3.1M % $CoCl_2$, and 90.6M % H_2O.

Cl^- Mn^{++} K^+ (372): $H_2O + MnCl_2 + KCl$; *v.* Fig. 61

Solid phases	Liquid phase t = 6°C		t = 28.4°C		t = 62.6°C	
	% $MnCl_2$	% KCl	% $MnCl_2$	% KCl	% $MnCl_2$	% KCl
$MnCl_2.4H_2O$	40.23	0.0	44.46	0.0		
$MnCl_2.2H_2O$					51.86	0.0
$MnCl_2.4H_2O + MnCl_2.KCl.2H_2O + KCl$	35.94	9.41				
$MnCl_2.2H_2O + MnCl_2.KCl.2H_2O$					49.95	6.67
$MnCl_2.4H_2O + MnCl_2.KCl.2H_2O$.			43.28	8.66		
$MnCl_2.KCl.H_2O + MnCl_2.2KCl.2H_2O$			38.65	13.79	44.05	12.49
$MnCl_2.2KCl.2H_2O + MnCl_2.4KCl + KCl$					36.85	18.77
KCl	0.0	23.06	0.0	26.91	0.0	31.57

Transition points	% $MnCl_2$	% KCl
At 52.8°C, $MnCl_2.4H_2O + MnCl_2.2H_2O + MnCl_2.KCl.2H_2O$ + Solution	50.14	6.11
At 58.3°C, $MnCl_2.4H_2O + MnCl_2.2H_2O$ + Solution	51.73	

Cl^- MnO_4^- K^+ (319): $H_2O + KCl + KMnO_4$

Solid phase	°C	Liquid phase—M per liter							
		KCl	$KMnO_4$	KCl	$KMnO_4$	KCl	$KMnO_4$	KCl	$KMnO_4$
$KMnO_4$	0	0.1	0.1395	0.5	0.076	1	0.0532	2	0.0379
	25	0.1	0.4315	0.5	0.306	1	0.220	2	0.1432
	40	0.1	0.738	0.5	0.584	1	0.444	2	0.288

Cl^- Fe^{++} Mg^{++} K^+

$H_2O + FeCl_2 + MgCl_2 + KCl$ (39); *v.* Fig. 63

	Solid phases	Liquid phase in g			
		$FeCl_2$	$MgCl_2$	KCl	H_2O
	t = 22.8°C				
	$FeCl_2.4H_2O$	100			151.2
	$MgCl_2.6H_2O$		100		181.0
	KCl			100	282.7
	$FeCl_2.4H_2O + FeCl_2.MgCl_2.8H_2O$* $+ MgCl_2.6H_2O$	15.79	84.14		160.6
	$MgCl_2.6H_2O + MgCl_2.KCl.6H_2O$		98.58	1.42	177.4
	$MgCl_2.KCl.6H_2O + KCl$		89.27	10.72	233.4
	$FeCl_2.4H_2O + KCl$	79.77		20.21	112.5
	$FeCl_2.4H_2O + MgCl_2.KCl.6H_2O + KCl$	51.89	30.25	13.87	140.7
	$FeCl_2.4H_2O + MgCl_2.6H_2O + MgCl_2.KCl.6H_2O$	16.18	82.85	0.85	161.2
	t = 43.2°C				
	$FeCl_2.4H_2O$	100			137
	$MgCl_2.6H_2O$		100		171.8
	KCl			100	242.6
A	$FeCl_2.4H_2O + MgCl_2.FeCl_2.8H_2O + FeCl_2.2H_2O$†	28.03	71.97		147
B	$MgCl_2.6H_2O + FeCl_2.MgCl_2.8H_2O$	19.38	80.62		150.4
C	$MgCl_2.6H_2O + MgCl_2.KCl.6H_2O$		98.58	1.41	168.1
D	$MgCl_2.KCl.6H_2O + KCl$		87.19	12.81	215.0
E	$FeCl_2.KCl.2H_2O + KCl$	76.69		23.32	95.4
F	$FeCl_2.4H_2O + FeCl_2.KCl.2H_2O$	78.71		21.29	103.5
P	$KCl + MgCl_2.KCl.6H_2O + FeCl_2.KCl.2H_2O$	51.53	31.89	16.56	125.7
Q	$FeCl_2.4H_2O + MgCl_2.KCl.6H_2O + FeCl_2.KCl.2H_2O$	52.30	36.18	11.56	129.7
R	$FeCl_2.4H_2O + MgCl_2.KCl.6H_2O + FeCl_2.MgCl_2.8H_2O$	31.57	65.36	3.04	141.9

* This solid first begins to appear at 22.8°C.
† This solid first begins to appear at 43.2°C.

Cl^- Fe^{+++} (17)

$H_2O + HCl + FeCl_3$; *v.* Fig. 62 and *also* p. 309

	°C	Solid phases	Liquid phase M per 1000M H_2O	
			$FeCl_3$	HCl
A	27.4	$FeCl_3.6H_2O + FeCl_3.\frac{7}{2}H_2O$	24.3	
B	15		23.50	10.75
C	30	$FeCl_3.\frac{7}{2}H_2O + FeCl_3.\frac{5}{2}H_2O$	30.24	
D	15		28.35	14.90
E	55	$FeCl_3.\frac{5}{2}H_2O + FeCl_3.2H_2O$	40.64	
F	30		36.75	17.15
G	66	$FeCl_3.2H_2O + FeCl_3$	58.40	
H	50		52.50	20.04
I	−60	$FeCl_3.6H_2O + FeCl_3.HCl.6H_2O$	3.7 *ca.*	19.0 *ca.*
J	−15		9.65	21.20
K	40 *ca.*	$FeCl_3.HCl.6H_2O + FeCl_3.HCl.4H_2O$	6.0 *ca.*	25.3 *ca.*
L	−15		15.80	24.50
M	65 *ca.*	$FeCl_3.HCl.4H_2O + FeCl_3.HCl.2H_2O$	28.5 *ca.*	55.0 *ca.*
N	40	$FeCl_3 + FeCl_3.HCl.2H_2O$	48.64	42.01
O	−13	$FeCl_3.HCl.6H_2O + FeCl_3.6H_2O + FeCl_3.HCl.4H_2O$	18.00	22.40
P	− 7.5	$FeCl_3.6H_2O + FeCl_3.\frac{7}{2}H_2O + FeCl_3.HCl.4H_2O$	23.72	19.22
Q	− 7.3	$FeCl_3.\frac{7}{2}H_2O + FeCl_3.\frac{5}{2}H_2O + FeCl_3.HCl.4H_2O$	28.55	23.08
R	−16.0	$FeCl_3.\frac{5}{2}H_2O + FeCl_3.2H_2O + FeCl_3.HCl.4H_2O$	31.89	28.40
S	−27.5	$FeCl_3.HCl.2H_2O + FeCl_3.HCl.4H_2O + FeCl_3.2H_2O$	34.21	32.23
T	10	$FeCl_3.HCl.2H_2O + FeCl_3.2H_2O$	39.95	35.04
U	29	$FeCl_3.2H_2O + FeCl_3 + FeCl_3.HCl.2H_2O$	49.84	33.71
	− 6	$FeCl_3.HCl.6H_2O$	16.66m	16.66m
	− 3	$FeCl_3.HCl.4H_2O$	25.00	25.00
	+45.7	$FeCl_3.HCl.2H_2O$	50.00	50.00

$Cl^- Fe^{+++}$; *v also* p. 308
$H_2O + HCl + Fe_2O_3$
$t = 25°C$ (66)

% Fe_2O_3*	% HCl*
$FeCl_3.HCl.2H_2O$	
34.61	59.88
33.27	60.23
$FeCl_3.HCl.2H_2O + FeCl_3$	
32.78	54.71
$FeCl_3 + FeCl_3.2H_2O$	
31.95	58.20
$FeCl_3.2H_2O$	
34.42	59.12
34.07	55.71
$FeCl_3.2H_2O + FeCl_3.\frac{5}{2}H_2O$	
34.21	55.47
$FeCl_3.\frac{5}{2}H_2O + FeCl_3.\frac{7}{2}H_2O$	
34.44	51.11
$FeCl_3.\frac{7}{2}H_2O + FeCl_3.6H_2O$	
33.04	46.72
$FeCl_3.6H_2O$	
24.42	33.40
$FeCl_3.6H_2O + Fe_2O_3.xHCl.H_2O$	
21.84	29.33
Solid soln.†	
16.82	22.55
14.62	19.53
11.76	15.28
9.84	12.67
7.64	9.91
5.25	6.80
2.85	3.66

* Includes data recalculated from work of Roozeboom and Schreinemakers (17).
† Solid soln. = $Fe_2O_3 + HCl + H_2O$.

$Cl^- Fe^{+++}$ (27.5)
$H_2O + Fe_2O_3 + FeCl_3$

$Cl^- Fe^{+++} Na^+$
$H_2O + FeCl_3 + NaCl$
$t = 21°C$ (186)

% $FeCl_3$	% NaCl
NaCl	
0	36.10
Solid soln. I	
24.27	9.10
25.40	8.45
26.40	5.25
38.15	3.90
45.38	2.45
46.75	2.11
$FeCl_3$	
83.39	0

$Cl^- Fe^{+++} K^+$
$H_2O + FeCl_3 + KCl$
$t = 21°C$ (186)

% $FeCl_3$	% KCl
KCl	
0	34.97
Solid soln. I	
13.44	24.45
23.18	16.54
28.05	11.69
35.72	11.68

$Cl^- Fe^{+++} K^+$.—(*Continued*)

% $FeCl_3$	% KCl
$FeCl_3.2KCl.H_2O$	
36.62	11.19
37.35	13.67
42.03	7.88
51.69	7.54
$FeCl_3$	
83.89	0.0

Transformation temperature, $FeCl_3.2KCl.H_2O$ = 22–22.5°C.

$Cl^- Fe^{+++} Cs^+$
$H_2O + FeCl_3 + CsCl$
$t = 21°C$ (186)

% CsCl	% $FeCl_3$
CsCl	
65.00	0.0
$FeCl_3.3CsCl.H_2O$	
55.18	0.45
52.38	2.01
51.44	5.24
$FeCl_3.2CsCl.H_2O$	
47.70	7.80
41.15	8.93
25.25	15.34
14.96	21.65
8.42	27.96
0.94	48.71
$FeCl_3$	
0.0	83.89

Transformation temperature, $FeCl_3.2CsCl.H_2O$ = 39.5–39.8°C.

$Cl^- Co^{++}$
$H_2O + HCl + CoCl_2$
$t = 0°C$ (136)

% $CoCl_2$	% HCl
$CoCl_2.6H_2O$	
31.66	0.0
25.58	3.26
17.78	8.74
12.79	12.44
5.97	19.01
4.74	20.51
2.69	25.66
3.07	27.77
6.34	29.38
9.91	29.15
11.58	28.97
$CoCl_2.6H_2O + CoCl_2.2H_2O$	
12.65	28.99
$CoCl_2.2H_2O$	
12.66	30.27
15.11	33.03
15.12	33.86

$Cl^- Co^{++} Na^+$ (406)
$H_2O + CoCl_2 + NaCl$

$Cl^- Co^{++} K^+$ (406)
$H_2O + CoCl_2 + KCl$

$Cl^- Co^{++} Rb^+$ (406)
$H_2O + CoCl_2 + RbCl$

$Cl^- Co^{++} Cs^+$ (406)
$H_2O + CoCl_2 + CsCl$

$Cl^- Ni^{++}$
$H_2O + HCl + NiCl_2$
$t = 0°C$ (136)

% HCl	% $NiCl_2$
$NiCl_2.6H_2O$	
0.0	35.27
6.53	26.71
14.09	15.67
18.62	9.68
21.70	6.15
23.03	5.30
25.74	3.65
26.16	4.02
$NiCl_2.6H_2O + NiCl_2.4H_2O$	
26.01	4.56
$NiCl_2.4H_2O$	
26.23	4.45
28.82	2.92
34.57	1.37
$NiCl_2.4H_2O + NiCl_2.2H_2O$	
35.03	1.40
$NiCl_2.2H_2O$	
36.00	1.06
37.22	0.82
40.61	0.43

$Cl^- U_2O_4^{--} Na^+$
$H_2O + NaCl + Na_2U_2O_4$
$t = 37°C$ (1)

g NaCl/l	g $Na_2U_2O_4$/l
NaCl	
0.284	1.866
0.277	1.184

$Cl^- U_2O_4^{--} Na^+$.—(*Cont'd*)

g NaCl/l	g $Na_2U_2O_4$/l
NaCl	
0.310	1.170
0.505	1.117
0.633	0.891
0.817	0.734
1.498	0.599
2.345	0.355
2.991	0.188
3.897	0.174
4.304	0.118
5.025	0.090

$Cl^- BO_3^{---}$
$H_2O + HCl + H_3BO_3$
$t = 26°C$ (175)

M_{HCl}/l	$M_{H_3BO_3}$/l
H_3BO_3	
0.0	0.907
0.130	0.895
0.260	0.870
0.390	0.842
1.30	0.645
2.16	0.542
4.32	0.308
6.00	0.338
7.08	0.327
8.74	0.327
9.51	0.338

$Cl^- B_4O_7^{--} Na^+$ (329): $H_2O + NaCl + Na_2B_4O_7$

Solid phases	Liquid phase $t = 0°C$ % NaCl	% $Na_2B_4O_7$	$t = 10°C$ % NaCl	% $Na_2B_4O_7$	$t = 25°C$ % NaCl	% $Na_2B_4O_7$
NaCl	26.20		26.32		26.43	
$NaCl + Na_2B_4O_7.10H_2O$	25.88	0.35	26.08	0.40	26.04	0.74
$Na_2B_4O_7.10H_2O$		1.09		1.59		3.08

$Cl^- Al^{+++}$ (410): $HCl + AlCl_3$

$Cl^- Al^{+++} K^+$ (409): $H_2O + AlCl_3 + KCl$

$Cl^- Mg^{++}$ (252): $H_2O + MgO + MgCl_2$

Solid phases*	Liquid phase % $MgCl_2$
$MgO.H_2O + 3MgO.MgCl_2.12H_2O$	14.01
$3MgO.MgCl_2.12H_2O + MgCl_2.6H_2O$	37.00

* These investigators (252) found the solid $MgO.H_2O$ to exist as a metastable phase in solutions containing from 14.01 to 20.95 % $MgCl_2$, also the solid $3MgO.MgCl_2.12H_2O$ as a metastable phase in solutions from 12.45 to 14.01 % $MgCl_2$. Robinson and Waggaman (315) had reported a solid solution composed of MgO and $MgCl_2$ in addition to solid $3MgO.MgCl_2.12H_2O$.

$Cl^- Mg^{++} Ca^{++}$: $H_2O + MgCl_2 + CaCl_2$; *v.* Fig. 64
$t = 25°C$ (244)

	Solid phases	Liquid phase % $CaCl_2$	% $MgCl_2$
A	$CaCl_2.6H_2O$	45.06	
B	$CaCl_2.6H_2O + CaCl_2.2MgCl_2.12H_2O$	38.70	9.43

Cl^- Mg^{++} Ca^{++}.—(*Continued*)

	Solid phases	Liquid phase % $CaCl_2$	Liquid phase % $MgCl_2$
C	$CaCl_2.2MgCl_2.12H_2O + MgCl_2.6H_2O$	31.17	14.54
D	$MgCl_2.6H_2O$	16.05	23.33
E	$MgCl_2.6H_2O$		35.54
°C	(198)		
16.7	$CaCl_2.6H_2O$	41.7	
16.7	$CaCl_2.6H_2O + MgCl_2.6H_2O$	23.89	18.20
16.7	$MgCl_2.6H_2O$		35.27
22	$MgCl_2.6H_2O + 2MgCl_2.CaCl_2.12H_2O + CaCl_2.6H_2O$	31.20	14.21
25	$CaCl_2.6H_2O + CaCl_2.4H_2O + 2MgCl_2.CaCl_2.12H_2O$	38.31	9.38
28.2	$MgCl_2.6H_2O + 2MgCl_2.CaCl_2.12H_2O$	29.80	15.53
28.2	$CaCl_2.4H_2O + 2MgCl_2.CaCl_2.12H_2O$	42.02	5.55
29.4	$CaCl_2.6H_2O + CaCl_2.4H_2O$	49.19	
32	$CaCl_2.4H_2O$	50.47	
32	$MgCl_2.6H_2O$		37.21

Cl^- Mg^{++} Ca^{++} Na^+ K^+; *v.* p. 311

Cl^- Mg^{++} Na^+ (36, 97, 192, 257, 375)
$H_2O + MgCl_2 + NaCl$

Solid phases	t = 0°C (36, 375) % $MgCl_2$	% NaCl	t = 25°C (36, 375) % $MgCl_2$	% NaCl	t = 105°C (257) % $MgCl_2$	% NaCl
$MgCl_2.6H_2O$	34.55		35.47		42.78	
$MgCl_2.6H_2O$ + NaCl	33.90	0.72	35.80	0.21	42.78	Tr.
NaCl	27.95	1.47	29.92	1.12	37.14	0.84
	19.34	6.19	24.40	4.11	34.55	1.16
	15.16	9.77	20.00	6.01	27.82	3.74
	7.48	17.93	16.84	8.79	26.69	4.17
			10.22	15.01	22.51	6.67
			5.95	19.50	13.09	14.44
			2.75	23.24	6.06	21.83
		26.29		26.27	1.66	26.35
						28.29

Invariant points (97, 192)

$MgCl_2.6H_2O + MgCl_2.4H_2O$ + NaCl + Solution (45.34% $MgCl_2$, 0.38% NaCl) at 116.16°C.

$MgCl_2.6H_2O + MgCl_2.4H_2O$ + Solution at 116.67°C.

Cl^- Mg^{++} Na^+ K^+ (97, 189): $H_2O + MgCl_2 + NaCl + KCl$

°C	Solid phases	Liquid phase % $MgCl_2$	% KCl	% NaCl
0	$MgCl_2.6H_2O + MgCl_2.KCl.6H_2O$ + NaCl	34.24	0.05	0.34
0	$MgCl_2.KCl.6H_2O$ + NaCl + KCl	25.42	1.18	1.85
25	$MgCl_2.6H_2O + MgCl_2.KCl.6H_2O$ + NaCl	35.26	0.08	0.41
25	$MgCl_2.KCl.6H_2O$ + NaCl + KCl	26.44	1.68	0.87
55	$MgCl_2.KCl.6H_2O + MgCl_2.6H_2O$ + NaCl	37.47	0.13	0.28
55	$MgCl_2.KCl.6H_2O$ + KCl + NaCl	28.08	2.36	1.67
83	$MgCl_2.KCl.6H_2O + MgCl_2.6H_2O$ + NaCl	36.90	0.43	0.73
83	$MgCl_2.KCl.6H_2O$ + KCl + NaCl	31.66	2.69	0.55

Cl^- Mg^{++} K^+ (97, 105, 155, 202, 244, 248)
$H_2O + MgCl_2 + KCl$; *v.* Fig. 65

	°C	Solid phases (202)	Liquid phase % $MgCl_2$	% KCl
B	− 33.6	$MgCl_2.12H_2O$ + Ice	20.64	
C	− 16.9	$MgCl_2.12H_2O + MgCl_2.8H_2O$	31.64	
D	− 3.4	$MgCl_2.8H_2O + MgCl_2.6H_2O$	34.37	
E	116.67	$MgCl_2.6H_2O + MgCl_2.4H_2O$	46.12	
F	181	$MgCl_2.4H_2O + MgCl_2.2H_2O$	55.74	
G	186	$MgCl_2.2H_2O$	56.05	
H	186	$MgCl_2.2H_2O$ + KCl	50.17	10.31
I	186	KCl		44.76
J	− 11.1	KCl + Ice		19.74
K	− 34.3	KCl + $MgCl_2.12H_2O$ + Ice	18.34	1.00
P	− 21	$MgCl_2.12H_2O + MgCl_2.KCl.6H_2O$ + KCl	25.53	1.48
Q	61.5	$MgCl_2.KCl.6H_2O$ + KCl	28.46	4.80
R	167.5	$MgCl_2.KCl.6H_2O$ + KCl	42.93	8.41
S	152.5	$MgCl_2.KCl.6H_2O + MgCl_2.4H_2O$ + KCl	49.04	4.61
T	176	$MgCl_2.4H_2O + MgCl_2.2H_2O$ + KCl	52.05	6.96
U	115.70	$MgCl_2.KCl.6H_2O + MgCl_2.6H_2O + MgCl_2.4H_2O$	45.74	0.88
	25°C (244)	$MgCl_2.6H_2O$	35.54	
		$MgCl_2.6H_2O + MgCl_2.KCl.6H_2O$	35.47	0.52
		$MgCl_2.KCl.6H_2O$ + KCl	26.66	3.19
		KCl	12.11	13.56
				26.74

Cl^- Ca^{++}; *v. also* p. 311
$H_2O + HCl + CaCl_2$

t = 25°C (271)

% $CaCl_2$	% HCl
$CaCl_2.6H_2O$	
44.77	0.0
43.59	1.92
43.71	2.96
$CaCl_2.6H_2O + CaCl_2.4H_2O$	
44.50	3.33
$CaCl_2.4H_2O$	
43.10	5.03
38.49	9.17
36.66	10.78
34.43	12.75
27.94	20.48
$CaCl_2.4H_2O + CaCl_2.2H_2O$	
28.52*	21.40*
$CaCl_2.2H_2O$	
27.81	21.83

* Mean of three results.

Cl^- Ca^{++} Na^+; *v.* p. 312

Cl^- Ca^{++} K^+; *v. also* p. 312
$H_2O + CaCl_2 + KCl$
t = 25°C (244)

% $CaCl_2$	% KCl
$CaCl_2.6H_2O$	
45.06	0.0
$CaCl_2.6H_2O$ + KCl	
44.66	3.05
KCl	
16.55	11.64
0.0	26.74

Cl^- Sr^{++}; *v. also* p. 311
$H_2O + HCl + SrCl_2$
t = 25°C (271)

% $SrCl_2$	% HCl
$SrCl_2.6H_2O$	
35.60	0.0
33.97	0.66
27.55	4.57
9.86	16.12
6.68	18.89
$SrCl_2.6H_2O + SrCl_2.2H_2O$	
2.11	27.14
$SrCl_2.2H_2O$	
1.29	28.23
0.13	37.66

Cl^- Sr^{++} K^+; *v.* p. 312

Cl^- Mg^{++} Ca^{++} Na^+ K^+ (191, 199): $H_2O + MgCl_2 + CaCl_2 + NaCl + KCl$

Solid phases	Liquid phase—M per 1000M H_2O, t = 25°C, 0.5 $CaCl_2$	0.5 $MgCl_2$	KCl	NaCl	t = 83°C, 0.5 $CaCl_2$	0.5 $MgCl_2$	KCl	NaCl
$NaCl + CaCl_2.6H_2O$	266			2				1
$NaCl + CaCl_2.2H_2O$					478			
$NaCl + MgCl_2.6H_2O$		212		2				
$MgCl_2.6H_2O + Mg_2CaCl_6.12H_2O$	181	103		2				
$NaCl + KCl$			39	89				
$NaCl + Mg_2CaCl_6.12H_2O + MgCl_2.6H_2O$					282	91		1
$NaCl + NaCl_2.2H_2O + KCl$					498		22	1
$NaCl + KCl + CaCl_2.6H_2O$	292		22	2				
$NaCl + MgCl_2.6H_2O + MgCl_2.KCl.6H_2O$		210	1	2				
$NaCl + MgCl_2.KCl.6H_2O + KCl$		141	11	4				
$NaCl + MgCl_2.KCl.6H_2O + KCl + CaCl_2.6H_2O$	183	10	19	2				
$NaCl + Mg_2CaCl_6.12H_2O + CaCl_2.6H_2O$	243	71		2				
$NaCl + CaCl_2.2H_2O + Mg_2CaCl_6.12H_2O$					478			1
$NaCl + Mg_2CaCl_6.12H_2O + MgCl_2.6H_2O + MgCl_2.KCl.6H_2O$	181	103		2	282	91		1
$NaCl + CaCl_2.2H_2O + KCl + MgCl_2.KCl.6H_2O$					432	54	21	1
$NaCl + Mg_2CaCl_6.12H_2O + CaCl_2.6H_2O + MgCl_2.KCl.6H_2O$	243	69	4	2				
$NaCl + Mg_2CaCl_6.12H_2O + CaCl_2.2H_2O + MgCl_2.KCl.6H_2O$					478			1

Cl^- Ca^{++} (270, 271): $H_2O + HCl + Ca(OH)_2$; *v.* Fig. 66 and p. 310

	Solid phases	Liquid phase, t = 25°C (271), % CaO	% HCl	t = 10°C (270), % CaO	% $CaCl_2$	t = 25°C (270), % CaO	% $CaCl_2$	t = 40°C (270), % CaO	% $CaCl_2$	t = 45°C (270), % CaO	% $CaCl_2$	t = 50°C (270), % CaO	% $CaCl_2$
A	$CaO.H_2O$	2.64	3.30	0.13		0.101	5.02	0.104		0.10		0.096	
		6.66	8.50										
	$CaO.H_2O + CaO.CaCl_2.2H_2O$							0.587†	31.90†	0.628†	31.84†		
B	$CaO.H_2O + 3CaO.CaCl_2.16H_2O$	9.29*	11.89*	0.102*	15.34*	0.150*	18.08*						
	$3CaO.CaCl_2.16H_2O$	12.44	15.99										
		15.10	19.41	0.115	32.38	0.170	28.37						
C	$3CaO.CaCl_2.16H_2O + CaO.CaCl_2.2H_2O$	17.15*	21.99*	0.151*	35.94*	0.250*	33.46*						
	$CaO.CaCl_2.2H_2O$	20.92	27.15	0.106	38.23	0.06	38.61	0.055	49.97				
D	$CaO.CaCl_2.2H_2O + CaCl_2.6H_2O$	22.56*	29.31*			0.022	44.51						
	$CaCl_2.6H_2O$	22.02	30.57										
E	$CaCl_2.6H_2O + CaCl_2.4H_2O$	22.48	32.57										
	$CaCl_2.4H_2O$	17.39	35.38						51.18				
F	$CaCl_2.4H_2O + CaCl_2.2H_2O$	14.40*	40.08*										
	$CaCl_2.2H_2O$	14.05	40.10								57.19		56.96
	$CaO.H_2O + CaO.CaCl_2.5(4)H_2O$											0.362	29.66
	$CaO.CaCl_2.5(4)H_2O + CaO.CaCl_2.2H_2O$											0.130†	36.88†
	$CaO.CaCl_2.2H_2O + CaCl_2.2H_2O$									0.121	56.96	0.058†	54.05†

* Mean of two results. † Mean of two or more results.

Cl^- Ca^{++} Na^+; Cl^- Ca^{++} K^+; *v.* p. 312

Cl^- Sr^{++} (270, 271): $H_2O + HCl + Sr(OH)_2$; *v.* Fig. 67 and p. 310

	Solid phases	Liquid phase, t = 25°C (271), % HCl	% SrO	t = 0°C (270), % SrO	% $SrCl_2$	t = 25°C (270), % SrO	% $SrCl_2$	t = 40°C (270), % SrO	% $SrCl_2$
A	$SrO.9H_2O$		0.85	0.35		0.85		1.48	
B	$SrO.9H_2O + SrO.SrCl_2.9H_2O$	15.37	22.94			1.09	33.41	2.49	32.07
	$SrO.9H_2O + SrCl_2.6H_2O$			0.31	30.58				
C	$SrO.SrCl_2.9H_2O + SrCl_2.6H_2O$	16.40	21.15			0.85	35.65	1.36	39.25
D	$SrCl_2.6H_2O$	17.24	18.01		30.68		35.60		39.62
E		20.66	6.44						
F	$SrCl_2.6H_2O + SrCl_2.2H_2O$	28.16	1.38						
G	$SrCl_2.2H_2O$	37.72	0.08						

Cl^- Sr^{++} K^+; *v.* p. 312

Cl^- Ca^{++} Na^+ (59, 297)
$H_2O + CaCl_2 + NaCl$

Solid phases	Liquid phase					
	t = 25°C		t = 50°C		t = 94.5°C	
	% $CaCl_2$	% NaCl	% $CaCl_2$	% NaCl	% $CaCl_2$	% NaCl
$CaCl_2.6H_2O$	45.65	0				
$CaCl_2.6H_2O$ + NaCl	43.52	1.024				
$CaCl_2.2H_2O$			57.00		61.0	
$CaCl_2.2H_2O$ + NaCl			56.3	0.9	58.1	0.8
NaCl	36.52	1.022	30.9	3.60	57.4	1.1
	34.43	1.158	15.10	13.2	52.7	1.2
	25.45	5.37	3.3	24.4	45.7	1.3
	21.37	7.60	0.0	26.8	32.8	4.3
	14.11	13.62			16.3	14
	2.87	23.81			15.3	15
	0.0	26.36			11.5	18.1
					0	28.4

Cl^- Ca^{++} K^+.—(*Continued from p. 310*)
$H_2O + CaCl_2 + KCl$
t = 30°C (19)

% $CaCl_2$	% KCl
$CaCl_2.4H_2O\alpha$	
50.2	0.0
$CaCl_2.4H_2O\alpha$ + KCl	
49.20	4.40
KCl	
31.83	3.90
13.65	14.70
0.0	27.20

Cl^- Sr^{++} K^+
$H_2O + SrCl_2 + KCl$
t = 25°C (161)
M per 1000g H_2O

KCl	0.5$SrCl_2$
$SrCl_2.6H_2O$	
0.0	7.034
0.0719	7.016
0.433	6.950
0.8576	6.882
1.594	6.764

Cl^- Ba^{++}
$H_2O + HCl + BaCl_2$
t = 30°C (256)

% HCl	% $BaCl_2$
$BaCl_2.2H_2O$	
0.0	27.84
1.36	24.17
3.32	19.24
5.02	15.21
7.13	10.80
10.02	5.78
13.25	2.37
16.93	0.38
20.62	0.0

Cl^- Ba^{++} Li^+
$H_2O + Ba(OH)_2 + LiCl$
t = 25°C (176)

M_{Cl^-}/l	M_{OH^-}/l
$Ba(OH)_2.8H_2O$	
2.30	1.336
1.42	0.937
0.75	0.745
0.0	0.555

Cl^- Ba^{++} (271, 339)
$H_2O + HCl + Ba(OH)_2$; *v.* Fig. 68

	Solid phases	Liquid phase			
		t = 25°C (271)		t = 30°C (339)	
		% BaO	% HCl	% $BaCl_2$	% BaO
A	$BaO.9H_2O$	4.99	0	0	4.99
				10.77	4.45
				17.08	4.60
B	$BaO.9H_2O + BaO.BaCl_2.5H_2O$	18.36	6.53		
	$Ba(OH)Cl.2H_2O + BaO.9H_2O$			18.67	4.61
	$Ba(OH)Cl.2H_2O$			21.46	3.27
				24.98	2.33
	$Ba(OH)Cl.2H_2O + BaCl_2.2H_2O$			27.36	1.77
C	$BaO.BaCl_2.5H_2O + BaCl_2.2H_2O$	21.92	9.58		
	$BaCl_2.2H_2O$	18.21	9.66		
D		2.83	12.90		
E	$BaCl_2.2H_2O + BaCl_2.H_2O$	0	37.34		
F	$BaCl_2.2H_2O$	0	38.63	27.42	1.78
				27.60	0

Cl^- Ba^{++} Na^+
$H_2O + BaCl_2 + Na_2O$; *v.* Fig. 69; t = 30°C (339)

	Solid phases	Liquid phase—M per 1000M H_2O			
		0.5 $BaCl_2$	0.5 BaO	NaCl	0.5 Na_2O
A	NaCl			110.94	
B	NaCl + $NaOH.H_2O$			5.18	417.36
C	$NaOH.H_2O$				420.83
D	$NaOH.H_2O + BaO.2H_2O$		2.29		409.33
E	$BaO.2H_2O + BaO.4H_2O$		4.53		244.47
F	$BaO.4H_2O + BaO.9H_2O$		5.97		194.74
G	$BaO.9H_2O$		12.33		
H	$BaO.9H_2O + Ba(OH)Cl.2H_2O$	42.04	15.00		
I	$Ba(OH)Cl.2H_2O + BaCl_2.2H_2O$	66.72	5.87		
J	$BaCl_2.2H_2O$	65.93			
K	$BaCl_2.2H_2O$ + NaCl	9.07		100.95	
P	$BaCl_2.2H_2O$ + NaCl + $Ba(OH)Cl.2H_2O$	5.61	5.84	105.89	
Q	$Ba(OH)Cl.2H_2O$ + NaCl + $BaO.9H_2O$		3.64	74.80	58.44
R	NaCl + $BaO.9H_2O + BaO.4H_2O$		7.31	19.84	187.55
S	NaCl + $BaO.4H_2O + BaO.2H_2O$		5.73	12.39	229.84
T	$BaO.2H_2O$ + NaCl + $NaOH.H_2O$		0.48	5.46	409.10

Cl^- Ba^{++} Na^+
$H_2O + HCl + BaO + Na_2O$; *v.* Fig. 70; t = 30°C (339)

	Solid phases	Liquid phase		
		% BaO	% HCl	% Na_2O
A	$BaO.9H_2O$	4.99		
B	$BaO.4H_2O + BaO.9H_2O$	1.87		24.63
C	$BaO.2H_2O + BaO.4H_2O$	1.34		29.24
D	$NaOH.H_2O + BaO.2H_2O$	0.57		41.08
E	$NaOH.H_2O$			42.0*ca.*
F	NaCl + $NaOH.H_2O$		0.61	41.94
G	NaCl		16.51	14.04
H			19.21	4.92
I			35.45	0.60
J	$BaCl_2.2H_2O + BaCl_2.H_2O$		38.77	
K	$BaCl_2.2H_2O$	2.85	12.91	
L		20.33	9.67	
M	$Ba(OH)Cl.2H_2O + BaCl_2.2H_2O$	21.92	9.58	
N	$BaO.9H_2O + Ba(OH)Cl.2H_2O$	18.35	6.53	
P	NaCl + $BaCl_2.2H_2O$	2.79	16.20	12.64
Q	NaCl + $BaCl_2.2H_2O + Ba(OH)Cl.2H_2O$	3.48	16.12	13.10
R	NaCl + $Ba(OH)Cl.2H_2O + BaO.9H_2O$	1.14	11.15	16.89
S	NaCl + $BaO.9H_2O + BaO.4H_2O$	2.20	2.83	25.18
T	NaCl + $BaO.4H_2O + BaO.2H_2O$	1.25	1.72	28.56
U	NaCl + $BaO.2H_2O + NaOH.H_2O$	0.11	0.61	39.47

Cl^- Ba^{++} Na^+ (126, 303, 347)
$H_2O + BaCl_2 + NaCl$

Solid phases	Liquid phase			
	t = 20°C (126)		t = 30°C (347)	
	% $BaCl_2$	% NaCl	% $BaCl_2$	% NaCl
$BaCl_2.2H_2O$	16.89	7.80		26.47
	10.04	14.50	2.28	25.28
	6.51	18.52		
	4.17	21.23		
$BaCl_2.2H_2O$ + NaCl	3.07	24.59	3.80	23.84
NaCl	1.65	25.28	2.28	25.28
				26.47

Cl^- Ba^{++} Na^+.—(*Continued*)
$H_2O + BaCl_2 + NaCl$

°C (303)	% $BaCl_2$	% NaCl
$NaCl + BaCl_2.2H_2O$*		
10	2.5	24.8
20	3.0	24.5
30	3.6	24.3
40	4.5	24.0
50	5.5	23.7
60	6.7	23.4
70	8.1	23.1
80	9.4	22.8
90	10.6	22.5
100	11.8	22.2

* Solid phases not determined after saturation; those given are probable.

Cl^- Ba^{++} Na^+
$H_2O + Ba(OH)_2 + NaCl$
t = 25°C (176)

M_{Cl^-}/l	M_{OH^-}/l
$Ba(OH)_2.8H_2O$	
2.82	0.806
1.43	0.699
0.73	0.63
0.0	5.55

Cl^- Ba^{++} Na^+
$H_2O + HCl + BaCl_2 + NaCl$
t = 30°C (339)

% $BaCl_2$	% HCl	% NaCl
$BaCl_2.2H_2O$		
26.70		
NaCl		
		26.47
$BaCl_2.2H_2O + NaCl$		
3.80		23.84
2.27	4.84	18.07
0.82	12.02	9.55
0.29	17.20	4.65
	23.16	1.54
	28.66	0.47
	36.51	0.12

Cl^- Ba^{++} K^+
$H_2O + Ba(OH)_2 + KCl$
t = 25°C (176)

M_{Cl^-}/l	M_{OH^-}/l
$Ba(OH)_2.8H_2O$	
3.40	0.676
1.75	0.660
0.86	0.645
0.0	0.555

Cl^- Ba^{++} K^+ (350)
$H_2O + BaCl_2 + KCl$

Solid phases	Liquid phase—g per 100g H_2O, t = 40°C		t = 60°C	
	$BaCl_2$	KCl	$BaCl_2$	KCl
$BaCl_2.2H_2O$..................	28.98		31.70	
$BaCl_2.2H_2O$ + KCl...........	9.15	23.98	14.83	23.09
KCl........................		28.63		31.20

Cl^- Ba^{++} Rb^+
$H_2O + Ba(OH)_2 + RbCl$
t = 25°C (176)

M_{Cl^-}/l	M_{OH^-}/l
$Ba(OH)_2.8H_2O$	
1.25	0.648
0.0	0.555

Cl^- Li^+
$H_2O + HCl + LiCl$
t = 25°C (179)

M_{HCl}/l	M_{LiCl}/l
$LiCl.H_2O$	
0.0	13.536
0.63	13.414
1.053	12.652
1.764	12.258

Cl^- Li^+ Na^+
$H_2O + LiCl + NaCl$
t = 25°C (364)

% LiCl	% NaCl
$LiCl.H_2O$	
45.8	0.0
$LiCl.H_2O$ + NaCl	
45.5	0.5
NaCl	
41.3	0.4
40.1	0.2
36.8	0.3

Cl^- Li^+ Na^+.—(*Continued*)

% LiCl	% NaCl
NaCl	
35.7	0.3
33.5	0.35
31.6	0.8
24.9	2.3
17.4	7.3
16.9	8.4
6.5	19.0
0	26.4

The work of Zhemchuzhnui and Rambach (402) had shown that LiCl and NaCl gave a continuous melting-point curve, and that the heat liberated when melts of these components were cooled, was at a maximum corresponding to 2LiCl.NaCl. The above work was designed to ascertain whether the maximum was due to the formation of the compound indicated or to the resolution of the solid solution into its component salts. Authors (364) conclude, chiefly from study of cooled mixtures by X-rays, that it was due to the last-named cause.

Cl^-Na^+; *v. also* p. 314
$H_2O + HCl + Na_2O$
g per 100g H_2O (14)

t = 0°C HCl	NaCl	t = 25°C HCl	NaCl
NaCl			
0.0	35.775	0.0	36.080
0.9116	34.170	0.9116	34.450
1.8233	32.445	1.8233	32.905
3.6465	29.120	3.6465	29.810

t = 25°C (179)

M_{HCl}/l	M_{NaCl}/l
NaCl	
0.0	5.456
0.607	4.850
1.032	4.467
1.590	3.782
2.117	3.297
3.283	2.343

t = 30°C (339)

% HCl	% Na_2O
NaCl	
35.65	0.06
20.16	2 40
18.33	4.96
17.01	8.58
16.50	14.05
13.39	15.87
8.49	19.45
2.72	26.79

Cl^- Na^+.—(*Continued*)

% HCl	% Na_2O
NaCl	
1.50	30.58
0.70	38.44
NaCl + $NaOH.H_2O$	
0.61	41.94
$NaOH.H_2O$	
0	42.0

t = 30°C (256)

% HCl	% NaCl
NaCl	
0.00	26.27
1.40	24.21
2.99	21.73
5.60	18.03
7.63	15.12
9.73	12.60
13.41	8.42
19.38	3.29
23.33	1.39

Cl^- Na^+ K^+; *v. also* p. 314
$H_2O + HCl + NaCl + KCl$
t = 25°C (183)

% HCl	% KCl	% NaCl
KCl + NaCl		
0	10.90	19.95
8.61	7.58	10.65
17.16	3.80	3.56
20.65	2.86	2.03
32.78	1.27	0.18

Cl^- K^+ (14, 179); *cf.* (410): $H_2O + HCl + KCl$

g per 100g H_2O: t = 0°C HCl	KCl	t = 25°C HCl	KCl	M per liter: t = 25°C (179) HCl	KCl
KCl				KCl	
0.0	28.355	0.0	35.925	0.000	4.272
0.9116	26.725	0.9116	34.155	0.566	3.749
1.8223	25.000	1.8223	32.430	1.020	3.379
3.6465	21.425	3.6465	28.960	1.590	2.868
				2.094	2.474
				3.252	1.739

Cl^- K^+
$H_2O + KOH + KCl$
t = 20°C (49)

M_{KOH}/l	M_{KCl}/l
KCl	
4.71	1.605
7.90	0.712
9.41	0.405
10.95	0.273
11.10	0.253
12.19	0.191
12.92	0.168
13.84	0.138
14.02	0.136
14.85	0.121
15.02	0.118

ClO_3^- SO_4^{--} Tl^+
$H_2O + TlClO_3 + Tl_2SO_4$
t = 20°C (281)

g $TlClO_3$/l	g Tl_2SO_4/l
$TlClC_3$	
38.51	0
$TlClO_3 + Tl_2SO_4$	
30.40	34.43
Tl_2SO_4	
0	48.59

ClO_3^- SO_4^{--} Ca^{++} K^+
$H_2O + Ca(ClO_3)_2 + K_2SO_4$
t = 25°C (94)
M per 1000M H_2O

K_2SO_4	$CaSO_4$	$KClO_3$
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O + KClO_3$		
1.03	0.454	12.27

Cl^- Na^+ (14, 141, 179, 256, 339)

$H_2O + HCl + Na_2O$; *v. also* p. 313, and, for more recent data on this system, *v.* (6.5)

Solid phases (141)	Liquid phase (141)															
	t = 0°C		t = 15°C		t = 20°C		t = 25°C		t = 30°C		t = 35°C		t = 45°C		t = 60°C	
	% NaCl	% NaOH	% NaCl	% NaOH	% NaCl	% NaOH	% NaCl	% NaOH	% NaCl	% NaOH	% NaCl	% NaOH	% NaCl	% NaOH	% NaCl	% NaOH
NaCl	26.3	0.0	26.3	0.0	26.4	0.0	26.4	0.0	26.5	0.0	26.6	0.0	26.7	0.0	27.0	0.0
	19.8	7.4	15.7	12.8	14.9	14.0	14.7	14.2	14.7	14.4	14.6	14.6	15.2	14.0	14.2	15.8
	12.2	17.2	8.3	23.1	6.6	26.1	6.5	26.6	6.4	26.9	5.8	28.4	5.9	28.7	6.6	28.3
	4.6	29.4	1.7	40.3	2.7	35.4	1.7	40.6	2.0	39.2	1.7	41.9	2.0	41.6	2.5	41.3
	1.5	39.4*	0.8	49.9	1.3	42.5	1.0	49.9	1.1	48.0	1.1	51.2	1.3	53.9	1.7	52.5
NaCl + $NaOH.4H_2O$	4.2	30.3														
NaOH	0.0	29.6														
NaCl + $NaOH.H_2O$	0.0	51.2	0.0	51.2	0.0	52.2	0.0	53.3								
$NaOH.H_2O$									0.0	54.3	0.0	55.4	0.0	57.8	0.0	63.5

* Solution supersaturated.

Cl^- Na^+ K^+

$H_2O + NaCl + KCl$ (35, 97, 269, 307); *v. also* p. 313

Solid phases	Liquid phase																			
	t = 0°C		t = 4.4°C		t = 5°C		t = 16.03°C		t = 25°C		t = 50°C		t = 55°C		t = 75°C		t = 83°C		t = 100°C	
	% KCl	% NaCl	% KCl	% NaCl	% KCl	% NaCl	% KCl	% NaCl	% KCl	% NaCl	% KCl	% NaCl	% KCl	% NaCl	% KCl	% NaCl	% KCl	% NaCl	% KCl	% NaCl
KCl	21.99		23.22		22.93		25.35		26.99		30.04				33.20				35.94	
									19.29	8.65										
									17.65	10.74										
									15.30	14.12										
KCl + NaCl	7.42	22.19	7.92	21.18	7.33	22.19	9.83	20.40	11.20	20.36	14.59	19.26	16.58	18.93	18.51	17.76	20.36	16.62	21.63	16.85
NaCl		26.22		26.32		26.33		26.32	10.32	20.84		26.80				27.41				28.31
									7.03	22.68										
									3.59	24.53										
										26.49										

Invariant points: KCl + Ice at −11.1°C. $NaCl.2H_2O$ + Ice at −21.85°C. $NaCl.2H_2O$ + KCl + Ice at −23.7°C. $NaCl.2H_2O$ + NaCl + KCl at −2.35°C

ClO_3^- NO_3^- K^+

$H_2O + KClO_3 + KNO_3$

t = 25°C (383)

% $KClO_3$	% KNO_3
$KClO_3$	
7.745	0
Solid soln. A*	
7.65	0.68
7.07	1.55
6.52	3.59
5.76	7.12
5.10	12.81
4.39	18.97
Solid soln. A* (saturated) + KNO_3	
3.90	27.14
KNO_3	
3.61	27.21
1.63	27.57
0	27.24

* Contains 0–14.37M % KNO_3.

ClO_3^- CO_3^{--} Na^+ (214)

$H_2O + NaClO_3 + Na_2CO_3$

t = 24.2°C

% Na_2CO_3	% $NaClO_3$
$NaClO_3$	
0.0	49.65
3.86	46.06

ClO_3^- CO_3^{--} Na^+.—(*Cont'd*)

% Na_2CO_3	% $NaClO_3$
$NaClO_3$	
5.98	42.91
10.75	37.30
$NaClO_3 + Na_2CO_3.7H_2O$	
11.12	36.90
$Na_2CO_3.7H_2O$	
11.59	36.21
11.90	35.20
13.40	30.08
14.41	27.50
$Na_2CO_3.10H_2O + Na_2CO_3.7H_2O$	
14.43	27.04
$Na_2CO_3.10H_2O$	
16.55	15.38
17.74	11.58
17.85	18.96
20.30	3.94
22.18	0.0
t = 40°C	
$NaClO_3$	
0.0	53.79
$NaClO_3 + Na_2CO_3.H_2O$	
7.46	46.45
$Na_2CO_3.H_2O$	
32.89	0.0

ClO_3^- CO_3^{--} Na^+ K^+

$H_2O + NaClO_3 + K_2CO_3$; *v.* Fig. 71

t = 24.2°C (214)

	Solid phases	Liquid phase—M per 1000M H_2O			
		$0.5Na_2CO_3$	$0.5K_2CO_3$	$KClO_3$	$NaClO_3$
A	$Na_2CO_3.10H_2O$	97.20			
B	$Na_2CO_3.10H_2O + NaKCO_3.6H_2O$	126.00	61.2		
C	$NaKCO_3.6H_2O + K_2CO_3.2H_2O$	39.6	280.8		
D	$K_2CO_3.2H_2O$		291.6		
E	$K_2CO_3.2H_2O + KClO_3$		288.0	0.54	
F	$KClO_3$			11.70	
G	$KClO_3 + NaClO_3$			4.50	169.20
H	$NaClO_3$				167.40
I	$NaClO_3 + Na_2CO_3.7H_2O$	72.0			120.6
J	$Na_2CO_3.7H_2O + Na_2CO_3.10H_2O$	83.16			81.0
P	$KClO_3 + NaClO_3 + Na_2CO_3.7H_2O$	75.6		3.78	113.04
Q	$KClO_3 + Na_2CO_3.7H_2O + Na_2CO_3.10H_2O$	83.16		3.60	75.96
R	$Na_2CO_3.10H_2O + KClO_3 + NaKCO_3.6H_2O$	114.12	72.0	1.08	
S	$NaKCO_3.6H_2O + KClO_3 + K_2CO_3.2H_2O$	25.92	234.0	0.9	

ClO_3^- CO_3^{--} K^+ (214)
$H_2O + KClO_3 + K_2CO_3$

Solid phases	Liquid phase, t = 24.2°C, % K_2CO_3	t = 24.2°C, % $KClO_3$	t = 40°C, % K_2CO_3	t = 40°C, % $KClO_3$
$K_2CO_3.2H_2O$	52.95		54.40	
$K_2CO_3.2H_2O + KClO_3$	52.67	0.189	51.80	1.04
$KClO_3$	49.24	0.252	29.24	1.46
	36.59	0.69	18.81	4.09
	30.55	1.09		12.44
	23.42	1.65		
	18.53	2.29		
	17.80	2.40		
	8.81	3.92		
		7.42		

ClO_3^- $HC_4H_4O_6^-$ K^+
$H_2O + KClO_3 + KHC_4H_4O_6$
t = 25°C (283)*

M_{KClO_3}/l	$M_{KHC_4H_4O_6}/l$
	$KHC_4H_4O_6$
0	0.0347
0.025	0.02562
0.05	0.01974
0.10	0.01382
0.20	0.00918

* Determinations are mean of two results.

ClO_3^- OsO_4 K^+
$H_2O + OsO_4 + KClO_3$
t = 14°C (208)
g per 100g H_2O

OsO_4	$KClO_3$
	$KClO_3$
0	5.32
10	5.65

ClO_3^- Tl^+ K^+
$H_2O + TlClO_3 + KClO_3$
t = 10°C (16)

Solid phases	M % $KClO_3$	Liquid phase, % $KClO_3$	% $TlClO_3$
$TlClO_3$	0	0	2.510
Solid soln. I*	2	0.673	1.922
	12.6	2.539	1.167
	25.01	3.875	0.874
Solid soln. I + Solid soln. II†		4.490	0.766
Solid soln. II†	99.6	4.546	0.648
	99.62	4.573	0.469
	99.67	4.562	0.268
$KClO_3$	100	4.833	0

* Solid soln. I contains from 0 to 36.3 molal % $KClO_3$.
† Solid soln. II contains from 98 to 100 molal % $KClO_3$.

ClO_3^- Na^+ K^+ (214)
$H_2O + NaClO_3 + KClO_3$

Solid phases	Liquid phase, t = 24.2°C, % $KClO_3$	t = 24.2°C, % $NaClO_3$	t = 40°C, % $KClO_3$	t = 40°C, % $NaClO_3$
$KClO_3$	7.50		12.44	
	6.91	6.73	8.02	10.94
	5.20	20.44	4.51	31.13
	4.08	27.90	4.22	35.41
	3.28	31.10	3.40	48.03
	3.35	36.91		
	2.82	43.99		
$KClO_3 + NaClO_3$	1.53	49.18	3.24	51.97
$NaClO_3$		49.65		53.80

ClO_3^- K^+: $H_2O + KOH + KClO_3$; t = 20°C (49)

M_{KClO_3}/l	M_{KOH}/l	M_{KClO_3}/l	M_{KOH}/l
$KClO_3$			
0.0924	4.71	0.0287	10.95
0.0882	5.06	0.0254	12.19
0.0609	6.35	0.0215	14.02
0.0445	7.95	0.0195	14.85
0.0410	8.60	0.0191	15.02
0.0351	9.41		

ClO_4^- SO_4^{--} NH_4^+ (142)
$H_2O + NH_4ClO_4 + (NH_4)_2SO_4$

Solid phases	Liquid phase, t = 25°C, % NH_4ClO_4	t = 25°C, % $(NH_4)_2SO_4$	t = 60°C, % NH_4ClO_4	t = 60°C, % $(NH_4)_2SO_4$
NH_4ClO_4	20.02	0.0	33.60	0.0
	13.11	11.06	28.56	7.04
	8.15	22.45	24.91	11.89
	4.24	33.75	21.66	16.69
			17.02	23.71
			12.60	30.80
$NH_4ClO_4 + (NH_4)_2SO_4$	3.00	41.70	8.26	40.92
$(NH_4)_2SO_4$	1.22	42.83	3.48	44.12
	0.0	43.50	0.0	46.80

ClO_4^- SO_4^{--} NH_4^+ Na^+ (142)
$H_2O + NH_4ClO_4 + Na_2SO_4$

	Solid phases	Liquid phase—M per 1000M H_2O: NH_4ClO_4	$0.5(NH_4)_2SO_4$	$NaClO_4$	$0.5Na_2SO_4$
	t = 25°C; *v.* Fig. 72				
A	$Na_2SO_4.10H_2O$				70.4
B	$Na_2SO_4.10H_2O + (NH_4)_2SO_4.Na_2SO_4.4H_2O$		63.77		108.6
	$(NH_4)_2SO_4.Na_2SO_4.4H_2O$		127.8		61.3
C	$(NH_4)_2SO_4.Na_2SO_4.4H_2O + (NH_4)_2SO_4$		198.10		38.01
D	$(NH_4)_2SO_4$		209.2		
E	$(NH_4)_2SO_4 + NH_4ClO_4$	8.41	205.7		
F	NH_4ClO_4	17.90	88.24		
		38.3			
		12.26		178.1	
G	$NH_4ClO_4 + NaClO_4.H_2O$	7.45		318.92	
H	$NaClO_4.H_2O$			310.0	
I	$NaClO_4.H_2O + Na_2SO_4$			310.6	2.06
	Na_2SO_4			174.8	6.98
J	$Na_2SO_4 + Na_2SO_4.10H_2O$			76.76	38.54
P	$NH_4ClO_4 + NaClO_4.H_2O + Na_2SO_4$	7.19		311.44	1.62
	$NH_4ClO_4 + Na_2SO_4$	15.77		83.34	31.54
Q*	$NH_4ClO_4 + Na_2SO_4 + Na_2SO_4.10H_2O$				
R	$NH_4ClO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O + Na_2SO_4.10H_2O$	11.28	53.1		103.7
	$NH_4ClO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$	8.92	102.9		62.6
S	$(NH_4)_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O + NH_4ClO_4$	7.59	191.98		32.8
	t = 60°C				
	Na_2SO_4				115.10
	$Na_2SO_4 + (NH_4)_2SO_4$		215.2		88.46
	$(NH_4)_2SO_4$		239.8		
	$(NH_4)_2SO_4 + NH_4ClO_4$	24.68	219.2		
	NH_4ClO_4	43.88	109.04		
		77.50			
		47.72		64.42	
		26.12		226.4	
	$NH_4ClO_4 + NaClO_4$	11.45		423.8	
	$NaClO_4$			425.4	
	$NaClO_4 + Na_2SO_4$			431.9	2.92

ClO_4^- SO_4^{--} NH_4^+ Na^+.—(*Continued*)

Solid phases	Liquid phase—M per 1000M H_2O			
	NH_4ClO_4	$0.5(NH_4)_2SO_4$	$NaClO_4$	$0.5Na_2SO_4$
t = 60°C.—(*Continued*)				
Na_2SO_4			165.98	6.52
			73.62	28.61
			38.54	55.70
$NH_4ClO_4 + NaClO_4 + Na_2SO_4$	11.48		431.6	2.44
$NH_4ClO_4 + Na_2SO_4$	44.30		74.06	22.04
	69.11			83.96
	29.40	112.92		84.86
$NH_4ClO_4 + Na_2SO_4 + (NH_4)_2SO_4$	16.82	206.8		80.88

* Position of point on diagram estimated.

ClO_4^- SO_4^{--} Ca^{++} K^+: $H_2O + KClO_4 + CaSO_4$; *t* = 25°C (94)

M per 1000M H_2O

K_2SO_4	$CaSO_4$	$KClO_4$
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O + KClO_4$		
2.944	0.256	1.635

ClO_4^- SO_4^{--} Na^+ (142): $H_2O + NaClO_4 + Na_2SO_4$

Solid phases	Liquid phase			
	t = 25°C		*t* = 60°C	
	% $NaClO_4$	% Na_2SO_4	% $NaClO_4$	% Na_2SO_4
$Na_2SO_4.10H_2O$	0.0	21.71		
	5.79	18.15		
	18.72	12.56		
$Na_2SO_4.10H_2O + Na_2SO_4$	31.21	9.07		
Na_2SO_4	41.68	4.28	0.0	31.20
	53.58	1.24	17.70	14.90
			31.55	6.95
			52.47	1.11
			64.65	0.37
$Na_2SO_4 + NaClO_4.H_2O$	67.67	0.26		
$NaClO_4.H_2O$	67.60	0		
$Na_2SO_4 + NaClO_4$			74.40	0.29
$NaClO_4$			74.30	0.0

Transition points

$NaClO_4.H_2O + NaClO_4$ at 50.8°C; 73.30% $NaClO_4$.
$NaClO_4.H_2O$ + Ice at −32°C; 56.00% $NaClO_4$.
$Na_2SO_4.10H_2O + Na_2SO_4$ at 32.38°C.

ClO_4^- NH_4^+ Na^+ (142): $H_2O + NH_4ClO_4 + NaClO_4$

Solid phases	Liquid phase			
	t = 25°C		*t* = 60°C	
	% NH_4ClO_4	% $NaClO_4$	% NH_4ClO_4	% $NaClO_4$
NH_4ClO_4	20.00	0.0	33.60	0.0
	15.07	9.29	25.78	12.35
	9.54	25.85	18.00	25.00
	4.87	43.64	12.54	37.34
	3.50	52.86	6.30	56.95
$NH_4ClO_4 + NaClO_4.H_2O$	1.51	67.42		
$NH_4ClO_4 + NaClO_4$			1.87	72.86
$NaClO_4.H_2O$	0.0	67.60		
$NaClO_4$			0.0	74.30

Transition points

$NaClO_4.H_2O + NaClO_4$ at 50.8°C; 73.30% $NaClO_4$.
$NaClO_4.H_2O$ + Ice at −32°C; 56.00% $NaClO_4$.
NH_4ClO_4 + Ice at −2.7°C; 9.8% NH_4ClO_4.

ClO_4^- SO_4^{--} K^+

$H_2O + KClO_4 + K_2SO_4$
t = 25°C (280)

% K_2SO_4	% $KClO_4$
$KClO_4$	
0	2.052
0.4276	1.800
0.8532	1.615

ClO_4^- AsO^+

$H_2O + HClO_4 + As_2O_3$
t = 25°C (360)
M per 1000g H_2O

$HClO_4$	$HAsO_2$
As_2O_3	
0.0	0.2067
0.2162	0.1963
0.5588	0.1900
0.9450	0.1770

ClO_4^- MnO_4^- K^+

$H_2O + KClO_4 + KMnO_4$
t = 6.8–7.2°C (277)

Solid phases, % $KMnO_4$	Liquid phase	
	% $KMnO_4$	% $KClO_4$
0	0.0	0.88
3.227	0.46	0.75
6.644	0.880	0.634
11.011	1.060	0.586
17.822	1.557	0.528
18.453	1.686	0.518
26.030	1.903	0.469
29.05	1.993	0.461
33.844	2.104	0.477
37.361	2.244	0.411
43.342	2.469	0.423
47.713	2.601	0.401
70.177	2.835	0.342
70.175	3.019	0.372
78.293	3.068	0.323
86.128	3.114	0.288
95.036	3.603	0.382
96.903	3.972	0.192
100.00	4.071	0.0

ClO_4^- K^+

$H_2O + HClO_4 + KClO_4$
t = 25.2°C (380)

$HClO_4$*	% $KClO_4$
$KClO_4$	
0.0	2.085
0.01	1.999
0.1	1.485
1.0	0.527

* Moles per l of soln. used as solvent.

Br^- I^- K^+

$H_2O + KBr + KI$
t = 25°C (3); *v.* Fig. 73

% KBr	% KI
KI	
0.0	149.26
Solid Soln. I*	
18.54	130.61
22.15	127.10
Solid soln. I* + solid soln. II†	
29.92‡	119.49‡
Solid soln. II†	
34.14	95.36
42.32	66.63
KBr	
68.47	0.0

* Solid soln. I contains from 0 to 14% KBr. † Solid soln. II, from 93.23 to 100% KBr. ‡ Average of four results.

Br^- SO_4^{--} Ca^{++} K^+

$H_2O + CaBr_2 + K_2SO_4$
t = 25°C (94)
M per 1000M H_2O

A*	B†	C‡	D§
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$			
2.71	0.231	1.52	
1.300	0.365	7.745	
	0.726	22.05	0.335
	0.334	53.41	4.23

* A = K_2SO_4. † B = $CaSO_4$. ‡ C = KBr. § D = $CaBr_2$.

Br^- NO_3^- Sr^{++}

$H_2O + SrBr_2 + Sr(NO_3)_2$
t = 25°C (164)

% $SrBr_2$	% $Sr(NO_3)_2$
$SrBr_2.6H_2O$	
57.599	0.0
51.422	0.366
51.246	0.733
50.891	1.469
50.084	3.042
48.621	5.885
43.512	15.961

$Br^- \; NH_4^+ \; AsO_2^-$

$H_2O + NH_4Br + As_2O_3$

$t = 30°C$ (353)

% As_2O_3	% NH_4Br
As_2O_3	
2.26	0.0
$(As_2O_3)_2.NH_4Br + As_2O_3$	
2.25	0.339
$(As_2O_3)_2.NH_4Br$	
0.679	4.37
0.518	7.18
0.386	13.31
0.303	20.14
0.237	31.69
0.154	41.34
$(As_2O_3)_2.NH_4Br + NH_4Br$	
0.190	45.66

$Br^- \; NH_4^+ \; AsO_2^-$.—*(Cont'd)*

% As_2O_3	% NH_4Br
NH_4Br	
0.0	44.80*

* By interpolation from earlier work.

$Br^- \; NH_4^+ \; PtBr_6^{--}$

$H_2O + NH_4Br + (NH_4)_2PtBr_6$

$t = 20°C$ (13)

M_{NH_4Br}/l	g$(NH_4)_2PtBr_6$/l
$(NH_4)_2PtBr_6$	
2.0	0.032
1.0	0.080
0.2	0.168
0.1	0.359

$Br^- \; NH_4^+ \; K^+$: $H_2O + NH_4Br + KBr$; $t = 25°C$ (129)

Solid phases—M %		Liquid phase—M/l	
NH_4Br	KBr	NH_4Br	KBr
Solid soln. I			
0.00	100.00	0.00	4.6862
0.26	99.74	0.0653	4.6522
1.27	98.73	0.2515	4.5051
3.02	96.78	0.5237	4.3390
8.42	91.58	1.5596	3.7043
17.20	82.80	2.6750	2.9167
27.98	72.02	3.5463	2.2021
32.58	67.47	3.8911	2.1856
39.45	60.55	4.2631	1.9501
variable	variable	4.4130	1.8674
Solid soln. II			
98.53	1.47	4.9061	1.5096
100.00	0.00	5.8914	0.00

$Br^- \; AsO_2^- \; Ca^{++}$

$H_2O + As_2O_3 + CaBr_2$

$t = 30°C$ (354)

% As_2O_3	% $CaBr_2$
As_2O_3	
1.78	0.0
1.58	9.65
1.28	20.13
0.912	34.90
0.698	47.67
0.513	52.06
0.562	55.95
$As_2O_3 + CaBr_2.6H_2O$	
0.687	58.22
$CaBr_2.6H_2O$	
0	58.20*

* By interpolation from earlier work.

$Br^- \; AsO_2^- \; Sr^{++}$

$H_2O + As_2O_3 + SrBr_2$

$t = 30°C$ (354)

% As_2O_3	% $SrBr_2$
As_2O_3	
2.26	0
1.69	11.69
1.74	22.09
1.48	31.98
1.25	41.91
1.07	46.87

$Br^- \; AsO_2^- \; Sr^{++}$.—*(Cont'd)*

% As_2O_3	% $SrBr_2$
$As_2O_3 + SrBr_2.6H_2O$	
0.991	48.91
$SrBr_2.6H_2O$	
0	49.11

$Br^- \; AsO_2^- \; Ba^{++}$

$H_2O + As_2O_3 + BaBr_2$

$t = 30°C$ (354)

% As_2O_3	% $BaBr_2$
As_2O_3	
2.26	0
2.09	9.41
2.03	16.88
1.97	24.03
$(As_2O_3)_2.BaBr_2$	
1.58	23.49
0.757	29.09
0.678	33.08
0.464	38.19
0.322	43.02
$(As_2O_3)_2.BaBr_2 + BaBr_2.2H_2O$	
0.277	50.03
$BaBr_2.2H_2O$	
0	50.62

$Br^- \; AsO_2^- \; Li^+$

$H_2O + As_2O_3 + LiBr$

$t = 30°C$ (353)

% As_2O_3	% LiBr
As_2O_3	
2.26	0.0
1.69	11.68
1.20	23.23
0.734	35.54
$(As_2O_3)_2.LiBr + As_2O_3$	
0.534	37.00
$(As_2O_3)_2.LiBr$	
0.332	42.62
0.290	43.86
0.281	43.87
0.198	46.75

$Br^- \; AsO_2^- \; Na^+$

$H_2O + As_2O_3 + NaBr$

$t = 30°C$ (353)

% As_2O_3	% NaBr
As_2O_3	
2.26	0.0
2.19	5.57
2.09	10.89
1.99	15.85
1.88	20.79
1.63	30.39
1.59	33.17
1.50	35.75
1.48	37.76
$(As_2O_3)_3.NaBr$	
1.20	39.24
1.09	40.52
0.953	43.64
0.903	44.65
0.852	45.99
0.808	46.93
$(As_2O_3)_3.NaBr + NaBr.2H_2O$	
0.719	50.25
$NaBr.2H_2O$	
0.0	49.50*ca.**

$Br^- \; AsO_2^- \; K^+$

$H_2O + As_2O_3 + KBr$

$t = 30°C$ (353)

% As_2O_3	% KBr
As_2O_3	
2.26	0.0
$(As_2O_3)_2.KBr + As_2O_3$	
2.25	0.336
$(As_2O_3)_2.KBr$	
0.818	2.51
0.563	6.58
0.460	12.78
0.350	19.10
0.327	22.59
0.293	25.09
0.242	31.06
0.275	36.98
0.174	41.70
$(As_2O_3)_2.KBr + KBr$	
0.166	42.07
KBr	
0.0	41.3*ca.**

* By interpolation from earlier work.

$Br^- \; CO_3^{--} \; Na^+$

$H_2O + NaBr + Na_2CO_3$

$t = 30°C$ (79)

% NaBr	% Na_2CO_3
$Na_2CO_3.10H_2O$	
0	27.98
2.41	27.54
4.06	26.72
$Na_2CO_3.10H_2O + Na_2CO_3.7H_2O$	
6.26	26.23
$Na_2CO_3.7H_2O$	
11.00	23.40
12.22	22.68
16.88	19.86
$Na_2CO_3.7H_2O + Na_2CO_3.H_2O$	
16.95	19.57
$Na_2CO_3.H_2O$	
19.32	18.11
33.39	8.45
36.13	6.90
44.75	3.04
$Na_2CO_3.7H_2O + NaBr.2H_2O$	
45.31	2.99
$NaBr.2H_2O$	
45.68	2.60
49.40	0

$Br^- \; HC_4H_4O_6^- \; K^+$

$H_2O + KBr + KHC_4H_4O_6$

$t = 25°C$ (283)

M_{KBr}/l*	$M_{KHC_4H_4O_6}$/l*
$KHC_4H_4O_6$	
0	0.0347
0.05	0.01965
0.10	0.01337
0.20	0.00865

* Mean of two results.

$Br^- \; Pb^{++} \; Ca^{++}$

$H_2O + PbBr_2 + CaBr_2$

$t = 25°C$ (181)

M per liter

½$CaBr_2$	½$PbBr_2$
$PbBr_2$	
0.00	0.05250
0.52	0.01334
1.04	0.02410
2.08	0.08760
3.13	0.23500
4.17	1.03474

$Br^- \; Pb^{++} \; Sr^{++}$

$H_2O + PbBr_2 + SrBr_2$

$t = 25°C$ (181)

M per liter

½$SrBr_2$	½$PbBr_2$
$PbBr_2$	
0.00	0.05250
0.52	0.01346
1.04	0.02546
2.08	0.08734
3.12	0.31180
4.16	1.13740

Br^- Pb^{++} Ba^+

$H_2O + PbBr_2 + BaBr_2$

t = 25°C (181)

M ½$BaBr_2$/l	M ½$PbBr_2$/l
$PbBr_2$	
0.00	0.05250
0.45	0.01214
0.91	0.02182
1.82	0.08886
2.76	0.32080
3.67	0.82800

Br^- Pb^{++} Na^+

$H_2O + PbBr_2 + NaBr$

t = 25°C (181)

M ½$PbBr_2$/l	M_{NaBr}/l
$PbBr_2$	
0.05250	0.00
0.01720	0.73
0.04494	1.47
0.14086	2.20
0.39160	2.93
0.78720	3.67
1.46740	4.40

Br^- Pb^{++} K^+

$H_2O + PbBr_2 + KBr$

t = 25°C (51.1)

% $PbBr_2$	% KBr
$PbBr_2$	
0.969	0.0
0.946	0.056
0.875	0.131
0.782	0.423
0.347	1.325
0.256	2.292
$PbBr_2$ + $2PbBr_2.KBr$	
0.310	4.967
$2PbBr_2.KBr$	
0.295	5.609
0.330	12.940
0.345	13.18
0.427	14.54
0.560	18.27
0.666	19.05
0.753	20.64
0.868	21.61
1.494	25.69
$2PbBr_2.KBr$ + $PbBr_2.KBr.$⅓H_2O	
3.160	30.11
$PbBr_2.KBr.$⅓H_2O	
3.622	31.97
4.248	33.80
5.038	35.68
$PbBr_2.KBr.$⅓H_2O + KBr	
7.205	38.87
KBr	
4.929	39.32
1.835	40.28
0.0	40.52

Br^- Hg^{++} Ca^{++}

$H_2O + HgBr_2 + CaBr_2$

t = 25°C (182)

M_{HgBr_2}/l	M_{CaBr_2}/l
$HgBr_2$(?)	
0.017	0

Br^- Hg^{++} Ca^{++}.—(*Continued*)

M_{HgBr_2}/l	M_{CaBr_2}/l
$HgBr_2$ (?)	
0.117	0.072
0.676	0.645
1.358	1.892
2.766	2.479
3.666	3.754

Br^- Hg^{++} Sr^{++}

$H_2O + HgBr_2 + SrBr_2$

t = 25°C (182)

M_{HgBr_2}/l	M_{SrBr_2}/l
$HgBr_2$(?)	
0.017	0
0.104	0.062
0.471	0.328
0.902	0.668
1.770	1.401
2.238	1.872

Br^- Hg^{++} Ba^{++}

$H_2O + HgBr_2 + BaBr_2$

t = 25°C (182)

M_{BaBr_2}/l	M_{HgBr_2}/l
$HgBr_2$(?)	
0	0.017
0.274	0.370
0.396	0.540
0.579	0.759
1.096	1.478

Br^- Hg^{++} Na^+

$H_2O + HgBr_2 + NaBr$

t = 25°C (182)

M_{HgBr_2}/l	M_{NaBr}/l
$HgBr_2$(?)	
0.017	0
0.078	0.118
0.285	0.596
0.540	1.142
1.276	2.448
1.550	2.997
2.306	5.246

Br^- Hg^{++} K^+

$H_2O + HgBr_2 + KOH$

t = ? (178)

M_{KOH}/l	M_{KBr}/l	M ½ $HgBr_2$/l
HgO*		
0.0011	0.00685	0.0075
0.00208	0.00890	0.0043
0.00318	0.0104	0.0018
0.0636†	0.9364†	0.0636†

* Solid phase not actually determined. Temperature used not given.

† Data from Bugarszky (51).

Br^- Hg^{++} K^+

$H_2O + HgBr_2 + KBr$

t = 25°C (182)

M_{HgBr_2}/l	M_{KBr}/l
$HgBr_2$(?)	
0.017	0
0.098	0.209
0.472	0.770
1.360	2.380
1.930	3.470

Br^- Ca^{++}

$H_2O + Ca(OH)_2 + CaBr_2$; *v.* Fig. 74

t = 25°C (270)

	Solid phases	Liquid phase % CaO	Liquid phase % $CaBr_2$
A	$CaO.H_2O$	0.118	0
		0.115	19.18
B	$CaO.H_2O + 3CaO.CaBr_2.16H_2O$	0.097	20.75
	$3CaO.CaBr_2.16H_2O$	0.080	32.92
C	$3CaO.CaBr_2.16H_2O + 4CaO.3CaBr_2.16H_2O$	0.359	54.22
	$4CaO.3CaBr_2.16H_2O$	0.199	58.90
D	$4CaO.3CaBr_2.16H_2O + CaBr_2.6H_2O$	0.209	60.09
	$CaBr_2.6H_2O$	0	60.07

Br^- Sr^{++}

$H_2O + Sr(OH)_2 + SrBr_2$; *v.* Fig. 75

t = 25°C (270)

	Solid phases	Liquid phase % SrO	Liquid phase % $SrBr_2$
A	$SrO.9H_2O$	0.85	0
B	$SrO.9H_2O + SrO.SrBr_2.9H_2O$	0.84	40.66
	$SrO.SrBr_2.9H_2O$	0.28	47.65
C	$SrO.SrBr_2.9H_2O + SrBr_2.6H_2O$	0.21	49.78
D	$SrBr_2.6H_2O$	0	49.79

Invariant Point: at *ca.* −28°C.

$SrBr_2.6H_2O$ + Ice + Solution = 41.7% $SrBr_2$.

Br^- Ba^{++}

$H_2O + Ba(OH)_2 + BaBr_2$; *v.* Fig. 76

t = 25°C (270)

	Solid phases	Liquid phase % BaO	Liquid phase % $BaBr_2$
A	$BaO.9H_2O$	4.05	
B	$BaO.9H_2O + BaO.BaBr_2.5H_2O$	3.71	36.41
C	$BaO.BaBr_2.5H_2O + BaBr_2.2H_2O$	0.79	50.65
D	$BaBr_2.2H_2O$		51.10

Invariant Point: at −22.6°C.

$BaBr_2.2H_2O$ + Ice + Solution = 46.6% $BaBr_2$.

Br^- K^+

H_2O + KOH + KBr

t = 20°C (49)

M_{KOH}/l	M_{KBr}/l
KBr	
7.90	1.012
9.41	0.693
10.95	0.515
11.10	0.451
12.19	0.348
12.92	0.306
13.84	0.247
14.02	0.246
14.85	0.214
15.02	0.210

BrO_3^- $C_2H_3O_2^-$ Ag^+

$H_2O + HC_2H_3O_2 + AgBrO_3$

t = 25°C (184)

g $HC_2H_3O_2$/l	g $AgBrO_3$/l
$AgBrO_3$	
0.0	1.9493
2.988	1.9429
5.985	1.9379
11.975	1.9206

BrO_3^- $C_2H_3O_2^-$ Ag^+.—(*Cont'd*)

g $HC_2H_3O_2$/l	g $AgBrO_3$/l
$AgBrO_3$	
29.943	1.863
59.880	1.8013
112.382	1.6178

I^- SO_4^{--} Ca^{++} Na^+ K^+

$H_2O + CaI_2 + Na_2SO_4 + K_2SO_4$

t = 25°C (94)

M per 1000M H_2O

NaI	K_2SO_4	$CaSO_4$
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$		
11.53	4.03	0.266

I^- SO_4^{--} Ca^{++} K^+

$H_2O + CaI_2 + K_2SO_4$

t = 25°C (94)

M per 1000M H_2O

K_2SO_4	$CaSO_4$	KI	CaI_2
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$			
0.731	0.443	11.25	0.0
0.0	0.565	26.63	0.835

I^- NO_3^- Pb^{++} Cu^{++} (123)

$H_2O + PbI_2 + Cu(NO_3)_2$*

g per 1000g H_2O; $t = 20°C$

$Cu(NO_3)_2$	$Pb(NO_3)_2$
$PbI_2 + CuI + I_2$	
95.5	2.24
148.4	6.50
190.0	13.10
227.0	23.9
274.6	48.9
290.8	61.6
320.3	97.4
$Pb(NO_3)_2 + PbI_2 + CuI + I_2$	
345.6	143.0

* $Cu(NO_3)_2 + PbI_2 \rightleftarrows Pb(NO_3)_2 + CuI + I_2$.

I^- NH_4^+ $(CH_3)_4N^+$

$H_2O + NH_4OH + (CH_3)_4NI$

$t = 25°C$ (184)

g NH_4OH/l	g $(CH_3)_4NI$/l
$(CH_3)_4NI$	
0.000	52.758
1.731	52.708
3.508	52.863
7.367	52.623
18.300	52.579
35.570	52.384
73.92	52.025

I^- NH_4^+ Pb^{++} (103)

$H_2O + NH_4I + PbI_2$

$t = 20°C$ %PbI_2	%NH_4I	$t = 50°C$ %PbI_2	%NH_4I
PbI_2			
0.06	0.0	0.17	0.0
0.02	3.54	0.14	6.13
0.03	6.06	0.15	9.91
$PbI_2 + PbI_2.NH_4I.2H_2O$			
0.10	7.02	0.29	13.47
$PbI_2.NH_4I.2H_2O$			
0.20	14.50	0.34	18.07
0.92	45.80	8.51	54.79
2.96	56.71	13.18	58.21
$PbI_2.NH_4I.2H_2O + NH_4I$			
4.90	61.10	16.06	61.35
NH_4I			
2.10	61.50	9.88	61.95
0.0	61.62	6.24	63.98
		0.0	66.47

I^- AsO_2^- K^+ (354)

$H_2O + As_2O_3 + KI$; $t = 30°C$

% As_2O_3	% KI
As_2O_3	
2.26	0
$(As_2O_3)_2.KI$	
0.772	1.19
0.296	9.56
0.183	22.89
0.150	34.31
0.119	40.79
0.081	47.07
0.115	53.51
$(As_2O_3)_2.KI + KI$	
0.134	60.54
KI	
0	61.50*

* By interpolation from earlier work.

I^- CO_3^{--} Na^+

$H_2O + NaI + Na_2CO_3$

$t = 30°C$ (79)

% Na_2CO_3	% NaI
$Na_2CO_3.10H_2O$	
27.4	0
26.5	2.4
25.5	4.7
25.2	5.2
24.4	8.6
$Na_2CO_3.10H_2O + Na_2CO_3.7H_2O$	
24.3*	9.45*
23.0	11.2
20.8	14.0
20.0	15.7
18.7	18.4
$Na_2CO_3.7H_2O + Na_2CO_3.H_2O$	
15.25*	25.4*
$Na_2CO_3.H_2O$	
13.1	29.1
10.4	33.3
6.4	40.4
4.2	46.0
3.1	49.5
2.7	51.0
1.5	54.6
0.9	57.6
0.6	61.2
$Na_2CO_3.H_2O + NaI.2H_2O$	
0.33*	65.5
$NaI.2H_2O$	
0	65.5

* Mean of two determinations.

I^- $HC_4H_4O_6^-$ K^+

$H_2O + KI + KHC_4H_4O_6$

$t = 25°C$ (283)

M_{KI}/l*	$M_{KHC_4H_4O_6}$/l*
$KHC_4H_4O_6$	
0	0.0347
0.05	0.01959
0.10	0.01324
0.20	0.00860

* Mean of two results.

I^- $(CH_3)_4N^+$ K^+

$H_2O + (CH_3)_4NI + KOH$

$t = 25°C$ (184)

g KOH/l	g $(CH_3)_4NI$/l
$(CH_3)_4NI$	
0	52.72
3.198	52.30
6.28	51.88
14.07	50.40

I^- Pb^{++} K^+ (103)

$H_2O + PbI_2 + KI$

$t = 13°C$ % PbI_2	% KI	$t = 50°C$ % PbI_2	% KI
PbI_2			
0.05	0.0	0.17	0.0
0.001	2.21	0.02	9.33
0.001	4.18	0.27	21.0
0.002	9.09	1.82	29.51
0.003	14.01	2.52	30.57

I^- Pb^{++} K^+.—(*Continued*)

$t = 13°C$ % PbI_2	% KI	$t = 50°C$ % PbI_2	% KI
$PbI_2 + PbI_2.KI.2H_2O$			
0.05	16.02	3.11	31.77
$PbI_2.KI.2H_2O$			
0.19	21.32	3.99	36.18
0.68	34.45	5.56	42.08
0.97	40.21	11.59	54.63
3.30	54.36	13.33	55.00
$PbI_2.KI.2H_2O + KI$			
4.54	56.55	14.14	56.41
KI			
3.10	56.90	9.72	58.49
0.0	57.66	5.55	60.28
		1.52	61.98
		0.0	62.39

g per 1000g H_2O (334)

°C	PbI_2	KI
$PbI_2 + PbI_2.KI.2H_2O$		
5		163
10		191
15	2	217
20	9	260
23	10.4	275
28	25	325
31	29	359
39	45	449
59	188	645
67	255	751
80	731	1 186
80	569.9	976.4
104.5	1 411	1 521
120	2 151	1 812
137	2 874	2 097
175	5 603	2 949
189		3 339
$KI + PbI_2.KI.2H_2O$		
9	96.6	1 352
13	114.3	1 384
23	186.3	1 510
50	526.7	1 906
64	789.3	2 161
83.5	1 108.6	2 134
92	1 273	2 566
137	2 382	3 278
165	4 187	4 227
218	10 303	
241	12 803	7 998
242	12 749	
250	15 264	
$PbI_2 + PbI_2.KI.\frac{1}{2}H_2O$		
194		3 727
207		4 750

I^- Pb^{++} K^+

$H_2O + PbI_2 + KI$

$t = 25°C$ (51.1)

% PbI_2	% KI
PbI_2	
0.0758	0.0
0.0234	0.083
0.0092	0.166
0.0042	0.332
0.002	0.664
0.0019	0.830

I^- Pb^{++} K^+.—(*Continued*)

% PbI_2	% KI
PbI_2	
0.0016	1.661
0.0020	3.320
0.0073	8.307
0.0316	13.610
0.0578	14.910
0.253	19.45
$PbI_2 + PbI_2.KI.2H_2O$	
0.428	21.32
$PbI_2.KI.2H_2O$	
0.553	26.82
1.221	36.73
2.249	43.8
3.712	49.43
4.654	51.61
5.876	54.6
$PbI_2.KI.2H_2O + KI$	
7.421	56.59
KI	
5.235	57.82
0.549	59.13
0.0	59.72

I^- Hg^{++} Ca^{++}

$H_2O + HgI_2 + CaI_2$

$t = 25°C$ (182)

M_{CaI_2}/l	M_{HgI_2}/l
HgI_2(?)	
0.053	0.050
0.252	0.261
0.468	0.440
0.484	0.458
1.799	1.706

I^- Hg^{++} Sr^{++}

$H_2O + HgI_2 + SrI_2$

$t = 25°C$ (182)

M_{HgI_2}/l	M_{SrI_2}/l
HgI_2(?)	
0.212	0.254
0.320	0.355
0.582	0.539
0.694	0.608

I^- Hg^{++} Ba^{++}

$H_2O + HgI_2 + BaI_2$

$t = 25°C$ (182)

M_{BaI_2}/l	M_{HgI_2}/l
HgI_2(?)	
0.099	0.059
0.748	0.742
0.978	0.898
1.508	1.462

I^- Hg^{++} Na^+

$H_2O + HgI_2 + NaI$

$t = 25°C$ (182)

M_{HgI_2}/l	M_{NaI}/l
HgI_2(?)	
0.412	0.794
0.622	1.385
0.945	2.225

I^- Hg^{++} K^+; *v.* p. 320

I^- Ag^+ K^+ (92)

$H_2O + AgI + KI$

Solid phases	Liquid phase					
	t = 0°C		t = 30°C		t = 50°C	
	% KI	% AgI	% KI	% AgI	% KI	% AgI
AgI	9.8	0.2	10.2	0.10	24.8	2.5
	20.5	1.5	31.4	10.0	33.8	16.0
	26.1	6.5	37.6	29.4	36.7	28.0
	34.6	26.6	38.8	42.8	38.1	39.0
	36.4	28.1			36.2	51.8
AgI + AgI.KI	41.3	38.0			36.6	53.5
AgI.KI	42.0	37.9			37.1	53.5
	42.70	37.6				
AgI.KI + KI	44.0	37.9			37.6	53.4
KI	46.6	31.3	43.9	42.8	40.2	50.4
	50.5	21.7	46.9	35.8	43.2	45.0
	51.2	18.0	55.5	16.0	47.10	38.0
	53.0	9.0	0	60.35	55.5	22.8
	56.10	0			59.1	10.7
AgI.2KI + KI	48.7	27.5	43.15	44.10		
AgI.2KI	50.3	21.0	39.5	49.6		
AgI + AgI.2KI			38.6	49.7		
AgI.2KI			40.9	47.7		
			41.4	46.3		

I^- Ca^{++}

$H_2O + Ca(OH)_2 + CaI_2$; *v.* Fig. 77

t = 25° (270)

	Solid phases	Liquid phase	
		% CaO	% CaI_2
A	$CaO.H_2O$	0.118	
B	$CaO.H_2O + 3CaO.CaI_2.16H_2O$	0.097	28.44
C	$3CaO.CaI_2.16H_2O + CaI_2.6H_2O$	0.587	66.72
D	$CaI_2.6H_2O$		66.80

I^- Hg^{++} K^+

$H_2O + HgI_2 + KI$

t = 25°C (182)

M_{HgI_2}/l	M_{KI}/l
HgI_2(?)	
0.127	0.303
0.180	0.390
0.510	1.034
0.700	1.554
1.224	2.519

I^- Sr^{++}

$H_2O + Sr(OH)_2 + SrI_2$

t = 25°C (270)

% SrO	% SrI_2
$SrO.9H_2O$	
0.85	0.0
0.57	22.36
0.53	29.98
0.55	39.50
$SrO.9H_2O + 2SrO.SrI_2.9H_2O$	
0.74	49.37
$2SrO.SrI_2.9H_2O$	
0.72	53.04
0.60	54.16
0.51	55.09
0.46	55.58
0.19	60.31
0.18	60.77
$2SrO.SrI_2.9H_2O + SrI_2.6H_2O$	
0.16	64.04

I^- Sr^{++}.—(*Continued*)

% SrO	% SrI_2
$SrI_2.6H_2O$	
0.0	64.70

I^- Ba^{++}

$H_2O + Ba(OH)_2 + BaI_2$

t = 25°C (270)

g per 100g H_2O

BaO	BaI_2
$BaO.9H_2O$	
4.05	0.0
3.25	18.38
3.01	28.43
3.00	32.92
3.08	42.28
$BaO.9H_2O + BaO.BaI_2.9H_2O$	
3.14	44.99
$BaO.BaI_2.9H_2O$	
1.67	40.85
1.25	52.39
1.04	53.68
0.64	56.77
0.40	60.33
0.36	62.76
$BaO.BaI_2.9H_2O + BaI_2.2H_2O$	
0.21	68.51
$BaI_2.2H_2O$	
0.27	68.53
0.0	68.59

I^- K^+

$H_2O + KOH + KI$

t = 20°C (49)

M_{KOH}/l	M_{KI}/l
KI	
9.41	1.72
10.95	1.23
11.10	1.176
12.19	0.933
12.92	0.824
14.02	0.672
15.02	0.558

IO_3^- SO_4^{--}

$H_2O + HIO_3 + H_2SO_4$

t = 24.77°C (242)

v. Fig. 77*a*

% H_2SO_4	g I_2O_5/l
HIO_3(?)	
50.0	54.79
60.0	34.68
75.0	19.48
78.0	18.66
I_2O_5(?)	
79.6	18.50
82.0	18.8
84.6	19.3
86.0	17.1
87.4	15.8
89.0	15.10
90.3	14.50
92.0	13.5
96.0	11.0
98.0	9.5
99.9	3.48
102	1.28
104	1.90
106	2.67

IO_3^- NO_3^- Pb^{++}

$H_2O + Pb(IO_3)_2 + Pb(NO_3)_2$

t = 25°C (163)

M per liter

½$Pb(IO_3)_2$	½$Pb(NO_3)_2$
$Pb(IO_3)_2$	
0.0001102	0.0
0.0000870	0.0001
0.0000411	0.001
0.0000185	0.01
0.0000160	0.100

IO_3^- NO_3^- Ag^+

$H_2O + HNO_3 + AgIO_3$

t = 25°C (185)

M_{HNO_3}/l*	g $AgIO_3$/l†
$AgIO_3$	
0.00	0.0503
0.125	0.0864
0.250	0.1075
0.500	0.1414
1.000	0.2067
2.000	0.3319
4.000	0.6985
8.000	1.5875

* Used as solvent.

† Per l of final solution.

IO_3^- NO_3^- Pb^{++} K^+

$H_2O + Pb(IO_3)_2 + KNO_3$

t = 25°C (163)

M per liter

½ $Pb(IO_3)_2$	KNO_3
$Pb(IO_3)_2$	
0.0001102	0.0
0.0001141	0.002
0.0001334	0.010
0.0002037	0.050

IO_3^- NO_3^- La^{+++} Na^+

$H_2O + La(IO_3)_3 + NaNO_3$

t = 25°C (163)

M per liter

⅓$La(IO_3)_3$	$NaNO_3$
$La(IO_3)_3$	
0.00309	0.0
0.0039277	0.025
0.0044763	0.050
0.0052443	0.100
0.0062619	0.200
0.0073972	0.400
0.0097464	0.800
0.012934	1.600
0.013697	3.200

IO_3^- NH_4^+

$H_2O + HIO_3 + NH_4IO_3$

t = 30°C (260)

% HIO_3	% NH_4IO_3
NH_4IO_3	
0.0	4.20
2.54	3.89
$NH_4IO_3 + NH_4IO_3.2HIO_3$	
4.53	3.81
$NH_4IO_3.2HIO_3$	
4.73	3.53
6.57	1.94
8.45	1.09
9.12	0.89
24.00	0.62
36.01	0.41
44.43	0.39
58.21	0.37
$NH_4IO_3.2HIO_3 + HIO_3$	
76.35	0.31
HIO_3	
76.70	0.0

IO_3^- Pb^{++} K^+

$H_2O + Pb(IO_3)_2 + KIO_3$

t = 25°C (163)

M per liter

½$Pb(IO_3)_2$	KIO_3
$Pb(IO_3)_2$	
0.0001102	0.0
0.0000697	0.00005304
0.0000437	0.0001061

IO_3^- La^{+++} Na^+

$H_2O + La(IO_3)_3 + NaIO_3$

t = 25°C (163)

M per liter

⅓$La(IO_3)_3$	$NaIO_3$
$La(IO_3)_3$	
0.00309	0.0
0.0028718	0.0000913
0.0025521	0.0004560

IO_3^- La^{+++} Na^+.—(*Cont'd*)

M per liter

⅓$La(IO_3)_3$	$NaIO_3$
$La(IO_3)_3$	
0.0022976	0.000913
0.0018050	0.001826
0.000892	0.003653
0.0006053	0.0045326
0.00044056	0.0067989

IO_3^- La^{+++} K^+

$H_2O + La(IO_3)_3 + KIO_3$

t = 25°C (163)

M per liter

⅓$La(IO_3)_3$	KIO_3
$La(IO_3)_3$	
0.003090	0.0
0.0028430	0.000099
0.0025464	0.0004957
0.0022465	0.0009914
0.0016897	0.0019828

IO_3^- Na^+

$H_2O + HIO_3 + NaIO_3$

t = 30°C (260)

% HIO_3	% $NaIO_3$
$NaIO_3.\frac{3}{2}H_2O$	
0.0	9.36
1.98	9.52
4.86	10.22
5.86	11.04
9.73m	14.73m
$NaIO_3.\frac{3}{2}H_2O + Na_2I_4O_{11}$	
6.75	11.14
$Na_2I_4O_{11}$	
7.80	10.30
9.93	8.71
11.20	7.54
$Na_2I_4O_{11} + NaIO_3.2HIO_3$	
11.82	7.20
$NaIO_3.2HIO_3$	
14.62	5.65
23.23	3.69
32.68	2.91
40.91	2.64
55.48	2.12
65.47	1.83
$NaIO_3.2HIO_3 + HIO_3$	
76.19	1.42

IO_3^- Na^+.—(*Continued*)

% HIO_3	% $NaIO_3$
HIO_3	
76.70	0.0

IO_3^- K^+

$H_2O + HIO_3 + KOH$

t = 30°C (260)

% HIO_3	% KIO_3
KIO_3	
0.0	9.51
$KIO_3 + KIO_3.HIO_3$	
0.65*	9.47*
$KIO_3.HIO_3$	
0.67	6.60
1.14	4.57
1.69	3.63
2 02	3.10
3.34	2.14
5.00	1.32
6.45m	1.35m
7.09	1.00
$KIO_3.HIO_3 + KIO_3.2HIO_3$	
8.04	0.85
$KIO_3.2HIO_3$	
9.35	0.64
12.04	0.44

IO_3^- K^+.—(*Continued*)

% HIO_3	% KIO_3
$KIO_3.2HIO_3$	
17.50	0.30
31.20	0.52
62.52	0.72
$KIO_3.2HIO_3 + HIO_3$	
76.40	0.80
HIO_3	
76.70	0.0

* Mean of three results.

IO_3^- K^+

$H_2O + KOH + KIO_3$

t = 20°C (49)

M_{KOH}/l	M_{KIO_3}/l
KIO_3	
4.71	0.0390
5.06	0.0362
6.35	0.0256
7.95	0.0179
9.41	0.0144
10.95	0.0130
11.10	0.0128
12.19	0.0131
12.92	0.0135
14.02	0.0154
14.85	0.0194

S^{--} SO_4^{--} Na^+ (209): $H_2O + Na_2S + Na_2SO_4$

Solid phases	Liquid phase									
	t = 0.1°C		t = 18°C		t = 25°C		t = 31°C		t = 40°C	
	% Na_2S	% Na_2SO_4	% Na_2S	% Na_2SO_4	% Na_2S	% Na_2SO_4	% Na_2S	% Na_2SO_4	% Na_2S	% Na_2SO_4
$Na_2S.10H_2O$	11.33									
Solid soln. I†	11.22	0.93								
Solid soln. I† + Solid soln. II‡	11.19*	1.21*								
Solid soln. II‡	9.49	1.27								
	7.36	1.48								
	4.79	1.68								
	1.44	2.99								
$Na_2S.9H_2O$			15.95		17.86		20.60		25.09	
					16.61	5.01	19.57	3.04	24.06	0.49
$Na_2S.9H_2O + Na_2SO_4$							19.51	4.22	23.77*	1.81*
Solid soln. III§			15.33	2.28						
			14.50	5.20						
			13.98	6.44						
Solid soln. III§ + Solid soln. II‡			13.89*	7.21*						
$Na_2SO_4.10H_2O$			13.08	7.01	4.40	17.12				
			10.91	6.96	3.27	17.84				
			5.33	9.05	1.63	19.71				
			2.84	10.67						
$Na_2SO_4.10H_2O + Na_2SO_4$					9.96*	14.69*				
Na_2SO_4					14.68	8.06	22.22	2.56	23.25	1.79
					11.21	12.56	16.36	6.58	21.91	2 44
							12.14	11.56	20.36	3.41
							7.47	18.92	14.97	7.37
							4.81	23.06	9.78	14.14
									6.18	20.25
									1.32	28.90

* Mean of several results.

† Solid soln. I = $Na_2S.10H_2O$ + small concentrations of $Na_2SO_4.10H_2O$.

‡ Solid soln. II = $Na_2SO_4.10H_2O$ + small concentrations of $Na_2S.10H_2O$.

§ Solid soln. III = $Na_2S.9H_2O$ + small concentrations of $Na_2SO_4.9H_2O$.

Transition points

$Na_2S.10H_2O + Na_2S.9H_2O$ + Solution (12.46% Na_2S) at 4.7°C.

$Na_2S.10H_2O + Na_2S.9H_2O + Na_2SO_4$ + Solution (11.49% Na_2SO_4 + 1.4% Na_2SO_4) at 2.3°C.

$Na_2SO_4.10H_2O + Na_2SO_4 + Na_2S.9H_2O$ + Solution (13.41% Na_2S + 9.48% Na_2SO_4) at 20.5°C.

S^{--} Ca^{++}; *see below*

SO_3^{--} SO_4^{--} Na^+ (313)

$H_2O + Na_2SO_3 + Na_2SO_4$; *v.* Fig. 78

	Solid phases	Liquid phase, $t = 0.1°C$, % Na_2SO_3	$t = 0.1°C$, % Na_2SO_4	$t = 17.5°C$, % Na_2SO_3	$t = 17.5°C$, % Na_2SO_4	$t = 25°C$ (stable), % Na_2SO_3	$t = 25°C$ (stable), % Na_2SO_4
A	Solid soln. I*			18.87	1.82		
				18.04	3.79	21.61	4.14
				17.09	5.97	19.44	8.97
		11.59	1.11	16.55	7.59	18.27	11.05
B	Solid soln. I + Solid soln. II†	11.36	1.77	16.47	7.65	16.81	14.52
C	Solid soln. II	8.56	1.95	14.78	7.93	14.61	15.25
		5.93	2.42	11.56	8.54	11.39	16.43
		3.07	3.11	8.48	9.89	9.22	17.31
				5.99	10.61	6.59	18.11
				2.61	12.15	4.11	19.66
						2.53	20.40

	Solid phases	$t = 25°C$ (metastable), % Na_2SO_3	$t = 25°C$ (metastable), % Na_2SO_4	$t = 37.5°C$, % Na_2SO_3	$t = 37.5°C$, % Na_2SO_4
D	Solid soln. III‡	27.29	1.69	27.51	1.80
		26.57	3.99	26.15	3.35
E		25.45	6.75	25.29	4.13
				24.81	5.28
F	Solid soln. IV§	21.88	12.34	25.78	7.14
		20.35	13.82	23.23	10.25
		18.52	16.18	21.52	12.05
		16.94	17.82	18.13	15.24
		15.43	19.12	16.47	17.26
G		14.39	20.51	8.90	25.16
	Solid soln. V‖			14.47	20.10
				9.04	24.66
				6.13	27.34
				4.78	28.36
				2.57	30.07

* Solid soln. I ($Na_2SO_4.7H_2O$, $Na_2SO_3.7H_2O$).
† Solid soln. II ($Na_2SO_4.10H_2O$, $Na_2SO_3.10H_2O$).
‡ Solid soln. III; § Solid soln. IV; ‖ Solid soln. V; (Na_2SO_4, Na_2SO_3); varying proportions, limits not given.

S^{--} Ca^{++} (310): $H_2O + H_2S + CaS$

$t = 0°C$*, g S/l	$t = 0°C$*, g $Ca(HS)_2$/l	$t = 20°C$, g S/l	$t = 20°C$, g $Ca(HS)_2$/l
CaS(?)			
138.0	228.3	148.8	246.0
157.0	259.4	155.0	255.8
169.0	278.7	159.0	262.1
176.0	289.6	160.8	264.7
179.0	294.1	162.0	266.6
181.0	297.1	165.0	271.2
186.5	304.4	167.5	274.9
189.5	308.4	172.0	281.8
193.0	312.7	173.0	283.2
198.5	320.0	174.5	285.3
$t = 20°C$		178.5	291.1
107.8	178.4	179.0	291.6
122.2	202.3	181.5	295.6
132.5	219.2	182.0	296.3
139.1	230.1	185.0	300.9
146.9	242.9		

S^{--} Ca^{++}.—(*Continued*)

g S/l	g $Ca(HS)_2$/l	g S/l	g $Ca(HS)_2$/l
CaS (?); $t = 40°C$			
79.5	131.6	150.5	248.2
102.9	170.3	154.9	255.0
124.9	206.9	159.6	262.1
134.5	222.5	164.2	269.6
138.9	229.6	169.0	276.9
142.1	234.7	171.0	280.0
146.7	242.2		

* Under variable pressure of H_2S.

SO_3^{--} Na^+ (159): $H_2O + NaOH + Na_2SO_3$

Solid phases	$t = 0.15°C$, % NaOH	$t = 0.15°C$, % Na_2SO_3	$t = 20°C$, % NaOH	$t = 20°C$, % Na_2SO_3	$t = 25°C$, % NaOH	$t = 25°C$, % Na_2SO_3	$t = 32°C$, % NaOH	$t = 32°C$, % Na_2SO_3
$Na_2SO_3.7H_2O$		12.2		21.2		23.6		
	3.0	9.0	1.60	18.70	0.7	22.5		
	9.0	5.2	4.40	15.40	2.5	19.3		
	16.9	2.8	9.90	11.0	5.0	17.7		
	21.9	2.21	12.70	9.40	9.7	13.0		
$Na_2SO_3.7H_2O + Na_2SO_3$	23.3	2.20	14.00	9.00	9.8	13.2		
Na_2SO_3	25.4	1.30	15.50	7.0	12.6	10.1	0	26.5
	26.6	0.7	20.2	3.5	17.2	5.8	2.3	23.1
	27.1	0.4	26.8	1.0	26.7	2.5	5.1	19.1
	27.9	0.1	50.1	Tr.	29.4	3.0	11.1	11.2
							16.5	5.4
							20.1	2.9
							27.2	0.6
							36.2	1.0
$NaOH.H_2O$	29.5*		52.2		53.30		54.4	

* Solid $NaOH.4H_2O$.

SO_4^{--} $S_2O_3^{--}$ Na^+; *v.* p. 323

SO_4^{--} HSO_3NO_2: $H_2O + H_2SO_4 + HNO_3$

$t = 0$ to 49.6°C (116.5)

Gives data for the solubility of $HSO_3.NO_2$ in solutions of H_2SO_4.

SO_4^{--} NO_3^- NH_4^+ (390); *cf.* (407)

$H_2O + (NH_4)_2SO_4 + NH_4NO_3$

Solid phases	$t = 0°C$, % NH_4NO_3	$t = 0°C$, % $(NH_4)_2SO_4$	$t = 70°C$, % NH_4NO_3	$t = 70°C$, % $(NH_4)_2SO_4$
$(NH_4)_2SO_4$	0	41.4	0	47.81
	5.61	37.89	11.10	40.81
$(NH_4)_2SO_4 + (NH_4)_2SO_4.2NH_4NO_3$	29.58	41.64	70.15	6.71
$(NH_4)_2SO_4.2NH_4NO_3$	29.81	21.33	71.58	5.82
	31.04	20.40		
$(NH_4)_2SO_4.2NH_4NO_3 + (NH_4)_2SO_4.3NH_4NO_3$	30.87	20.43	73.48	5.14
$(NH_4)_2SO_4.3NH_4NO_3$	31.61	19.50	76.01	3.96
			80.25	2.68
$(NH_4)_2SO_4.3NH_4NO_3 + NH_4NO_3$	45.99	9.53	81.01	2.45
NH_4NO_3	49.12	6.00	81.38	2.41
	54.19	0.0	84.03	0.0

SO_4^{--} NO_3^- NH_4^+: $H_2O + H_2SO_4 + NH_4NO_3$ (400.5)

SO_4^{--} $S_2O_3^{--}$ Na^+ (144): $H_2O + Na_2SO_4 + Na_2S_2O_3$

Solid phases	Liquid phase t = 0.8°C % Na_2SO_4	t = 0.8°C % $Na_2S_2O_3$	t = 18°C % Na_2SO_4	t = 18°C % $Na_2S_2O_3$	t = 25°C % Na_2SO_4	t = 25°C % $Na_2S_2O_3$	t = 40°C % Na_2SO_4	t = 40°C % $Na_2S_2O_3$
$Na_2SO_4.10H_2O$	4.60		14.11		21.60			
Na_2SO_4							32.37	
Solid soln. I†	2.31	9.63	10.71	9.36	18.44	7.30		
	1.87	19.62	8.45	15.86	16.13	13.22		
	1.34	30.07	7.14	22.46	13.97	19.35		
			5.97	27.00	12.97	24.96		
			6.32	32.31				
			6.14	35.07				
Solid soln. I† + Solid soln. II‡	1.19*	32.75*	6.26	35.42				
Solid soln. II‡	1.44	32.72	6.31	35.46	4.69	39.45	2.14	49.88
			4.87	36.61	2.01	41.53	1.58	50.15
			1.65	39.12			0.67	50.49
Solid soln. II‡ + Solid soln. III§					5.50*	38.86*	2.17*	49.70
Solid soln. III§					12.15	28.0	24.79	9.06
					7.73	34.72	14.76	22.95
							10.40	30.44
							5.90	39.74
							2.46	48.78
Solid soln. I† + Solid soln. III§					12.72*	26.76*		
$Na_2S_2O_3.5H_2O$		33.57		40.36		43.50		51.23

* Mean of several results.
† Solid soln. I = $Na_2SO_4.10H_2O$ + small concentrations of $Na_2S_2O_3.10H_2O$.
‡ Solid soln. II = $Na_2S_2O_3.5H_2O$ + small concentrations of $Na_2SO_4.5H_2O$.
§ Solid soln. III = Na_2SO_4 + small concentrations of $Na_2S_2O_3$.

SO_4^{--} NO_3^- NH_4^+ Ca^{++} (62, 80)

$H_2O + NH_4NO_3 + CaSO_4$

t = 20°C (80)

% NH_4NO_3*	% $CaSO_4$*
4.667	0.6074
8.490	0.7720
14.346	0.9006
18.883	0.9701
23.229	1.0220
28.211	1.0480
30.905	1.0467
36.089	1.0308
t = 27.5°C (80)	
27.544	1.0280
35.932	1.0190
43.616	0.9680
51.148	0.8845
58.303	0.7965
63.814	0.7227
t = 25°C (62)	
10	3.18
25	3.93
55	5.80
100	7.65
150	8.88
200	9.85
300	10.80
400	11.40
550	12.02
750	12.20
1000	11.81
1200	11.10
1400	10.02
Saturation	7.55

* Solid phase not determined: Probably $CaSO_4.2H_2O$.

SO_4^{--} NO_3^- Th^{++++}

$H_2O + HNO_3 + Th(SO_4)_2$

t = 30°C (235)

% HNO_3	% $Th(SO_4)_2$
$Th(SO_4)_2.8H_2O$	
0.0	2.15
5.17	3.68
10.04	4.20
16.68	4.84
21.99	4.47
28.33	3.96
28.51	3.88
33.17	3.34
38.82	2.51

SO_4^{--} NO_3^- Cu^{++} (255)

$H_2O + CuSO_4 + Cu(NO_3)_2$

t = 20°C

% $Cu(NO_3)_2$	% $CuSO_4$
$Cu(NO_3)_2.6H_2O$	
55.94	0.0
$Cu(NO_3)_2.6H_2O + CuSO_4.5H_2O$	
55.18	1.14
$CuSO_4.5H_2O$	
40.24	1.69
34.24	2.42
11.51	7.77
0.0	17.52
t = 35°C	
$CuSO_4.5H_2O$	
0.0	21.00
11.37	11.04
43.10	1.62
51.90	0.86
54.67	0.79
59.11	1.02

SO_4^{--} NO_3^- Cu^{++}.—(*Cont'd*)

t = 35°C

% $Cu(NO_3)_2$	% $CuSO_4$	% $Cu(NO_3)_2$	% $CuSO_4$
$CuSO_4.5H_2O + Cu(NO_3)_2.3H_2O$		$Cu(NO_3)_2.3H_2O$	
60.53	1.27	60.92	0.0

SO_4^{--} NO_3^- Cu^{++} Na^+

$H_2O + Cu(NO_3)_2 + Na_2SO_4$; *v.* Fig. 79

t = 20°C (255)

	Solid phases	Liquid phase—M per 1000M H_2O: $0.5Cu(NO_3)_2$	$0.5CuSO_4$	$NaNO_3$	$0.5Na_2SO_4$
A	$CuSO_4.5H_2O$		47.92		
B	$CuSO_4.5H_2O + Cu(NO_3)_2.6H_2O$	241.41	5.57		
C	$Cu(NO_3)_2.6H_2O$	257.6			
D	$Cu(NO_3)_2.6H_2O + NaNO_3$	247.14		26.96	
E	$NaNO_3$			186.32	
F	$NaNO_3 + NaNO_3.Na_2SO_4.H_2O$			180.02	16.0
G	$NaNO_3.Na_2SO_4.H_2O + Na_2SO_4.10H_2O$			124.68	38.59
H	$Na_2SO_4.10H_2O$				49.18
I	$Na_2SO_4.10H_2O + CuSO_4.Na_2SO_4.2H_2O$		34.53		53.46
J	$CuSO_4.Na_2SO_4.2H_2O + CuSO_4.5H_2O$		48.32		41.50
	$Na_2SO_4.10H_2O + CuSO_4.Na_2SO_4.2H_2O$		27.42	46.89	26.81
P	$Na_2SO_4.10H_2O + CuSO_4.Na_2SO_4.2H_2O + NaNO_3.Na_2SO_4.H_2O$		1.16	121.79	38.03
Q	$NaNO_3 + CuSO_4.Na_2SO_4.2H_2O + NaNO_3.Na_2SO_4.H_2O$		1.52	155.22	15.53
	$NaNO_3 + CuSO_4.Na_2SO_4.2H_2O$	32.00		129.65	5.07
	$CuSO_4.Na_2SO_4.2H_2O + CuSO_4.5H_2O$	34.74		37.82	27.06
R	$CuSO_4.5H_2O + CuSO_4.Na_2SO_4.2H_2O + NaNO_3$	55.29		101.68	4.75
	$CuSO_4.5H_2O + NaNO_3$	86.75		93.70	5.38
		141.52		73.17	3.05
S	$Cu(NO_3)_2.6H_2O + CuSO_4.5H_2O + NaNO_3$	243.70		20.14	2.5

SO_4^{--} NO_3^- Ag^+

$H_2O + HNO_3 + Ag_2SO_4$

t = 25°C (185)

% HNO_3	% Ag_2SO_4
Ag_2SO_4	
0.0	0.8330
5.956	3.2126
11.473	4.4276
21.029	5.9949
21.90	6.1234
27.81	6.7926
39.36	7.1042
45.53	6.6398

SO_4^{--} NO_3^- Mg^{++}

$H_2O + Mg(NO_3)_2 + MgSO_4$

t = 25°C (217)

% $Mg(NO_3)_2$	% $MgSO_4$
$Mg(NO_3)_2.6H_2O$	
43.25	0
40.76	1.02
$Mg(NO_3)_2.6H_2O + MgSO_4.7H_2O$	
40.15	2.77
$MgSO_4.7H_2O$	
35.07	3.62
25.90	6.56
8.88	17.85
0	26.30

SO_4^{--} NO_3^- Mg^{++} Ca^{++}

$H_2O + MgSO_4 + Ca(NO_3)_2$

t = 25°C (62, 361)

% $CaSO_4$	% $Mg(NO_3)_2$
$CaSO_4.2H_2O$	
0.2088	0
0.5656	2.450
0.7582	4.8086
0.9197	9.2712
1.1602	17.394
1.1485	24.610
1.1452	31.198
1.1097	37.925
$CaSO_4.2H_2O + Mg(NO_3)_2$	
1.525	61.51

SO_4^{--} NO_3^- Ca^{++}

$H_2O + H_2SO_4 + Ca(NO_3)_2$

t = 20°C (18)

g $CaSO_4$/l	g HNO_3/l
$CaSO_4.2H_2O$	
4.397	6.300
10.435	31.500
15.147	63.000
20.607	126.00

SO_4^{--} NO_3^- Ca^{++}

$H_2O + CaSO_4 + Ca(NO_3)_2$

t = 25°C (361)

% $Ca(NO_3)_2$	% $CaSO_4$
$CaSO_4.2H_2O$	
0.00	2.088
24.60	1.221
48.46	1.159
93.69	1.062
175.92	0.8171
249.27	0.631
316.06	0.449

SO_4^{--} NO_3^- Ca^{++}.—(*Cont'd*)

% $Ca(NO_3)_2$	% $CaSO_4$
$CaSO_4.2H_2O$	
376.48	0.304
402.37	0.256

SO_4^{--} NO_3^- Ca^{++} Na^+

$H_2O + CaSO_4 + NaNO_3$

t = 25°C (62, 361)

% $CaSO_4$	% $NaNO_3$
$CaSO_4.2H_2O$	
0.2088	0.0
0.4184	2.460
0.5319	4.835
0.6645	9.360
0.7754	17.643
0.7790	25.178
0.5782	43.99
0.5206	47.33

SO_4^{--} NO_3^- Ca^{++} Na^+ K^+

$H_2O + Ca(NO_3)_2 + Na_2SO_4 + K_2SO_4$

t = 25°C (94)

M per 1000M H_2O

$NaNO_3$	K_2SO_4	$CaSO_4$
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$		
23.39	5.685	0.457

SO_4^{--} NO_3^- Ca^{++} K^+

$H_2O + H_2SO_4 + Ca(NO_3)_2 + K_2SO_4$

t = 25°C (94)

M per 1000M H_2O

HNO_3	K_2SO_4	$CaSO_4$
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$		
7.52	6.32	0.408

SO_4^{--} NO_3^- Ca^{++} K^+

$H_2O + CaSO_4 + KNO_3$

t = 25°C (361)

% $CaSO_4$	% KNO_3
$CaSO_4.2H_2O$	
0.2088	0
0.3257	1.24
0.4018	2.462
0.5092	4.844
0.6451	9.412
0.7238	13.731
0.7741	17.82
$CaSO_4.K_2SO_4.H_2O$(?)	
?	22.53

SO_4^{--} NO_3^- Ca^{++} K^+

$H_2O + Ca(NO_3)_2 + K_2SO_4$

t = 25°C (94, 162, 361)

M per 1000M H_2O

K_2SO_4	$CaSO_4$	KNO_3
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$		
2.66	0.305	2.22
2.16	0.291	4.59
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O + KNO_3$		
$Ca(NO_3)_2$		
2.64	0.667	59.50

SO_4^{--} NO_3^- Ca^{++} K^+.—(*Continued*)

% $CaSO_4$	% KNO_3
$CaSO_4.2H_2O$*	
0.44	2.24
0.55	4.51
0.71	9.11
0.95	18.63
1.12m?	28.57m?
1.25m?	38.97m?
$CaSO_4.2H_2O$†	
0.2085	0
0.2454	0.27824
0.2727	0.53106
0.2862	1.0330

* Recalculated from data of (361).
† Data of (162).

SO_4^{--} NO_3^- Sr^{++}

$H_2O + HNO_3 + SrSO_4$

t = 25°C (18)

M_{HNO_3}/l	g $SrSO_4$/l
$SrSO_4$	
0.1	0.49
0.5	1.38
1.0	2.17
2.0	3.07
5.0	3.81

SO_4^{--} NO_3^- Ba^{++}

$H_2O + H_2SO_4 + Ba(NO_3)_2$

t = 25°C (18)

M_{HNO_3}/l	g $BaSO_4$/l
$BaSO_4$	
0.5	0.070
1.0	0.107
2.0	0.170
5.0	0.241

SO_4^{--} NO_3^- Li^+ (255): $H_2O + LiNO_3 + Li_2SO_4$; *v.* Fig. 80

	Solid phases	Liquid phase % Li_2SO_4	Liquid phase % $LiNO_3$
	t = 25°C		
	$Li_2SO_4.H_2O$	25.79	
		8.12	18.64
		1.14	33.90
		0.19	43.45
	$Li_2SO_4.H_2O + LiNO_3.3H_2O$		47.60
	$LiNO_3.3H_2O$		47.58
	t = 35°C; *v.* Fig. 80		
A	Li_2SO_4	24.76	
B	$Li_2SO_4.H_2O + 9Li_2SO_4.LiNO_3.27H_2O$	23.85	1.48
C	$9Li_2SO_4.LiNO_3.27H_2O + 11Li_2SO_4.LiNO_3.17H_2O$	7.50	19.12
D	$11Li_2SO_4.LiNO_3.17H_2O + Li_2SO_4.H_2O$		50.55
E	$Li_2SO_4.H_2O + Li_2SO_4$		57.91
F	$Li_2SO_4 + LiNO_3$		62.05
G	$LiNO_3$		61.93

SO_4^{--} NO_3^- Na^+; *v.* p. 325

SO_4^{--} NO_3^- Na^+ K^+ (158): $H_2O + Na_2SO_4 + KNO_3$; *v.* Fig. 82

	Solid phases	Liquid phase—M per 1000M H_2O: $0.5Na_2SO_4$	$NaNO_3$	$0.5K_2SO_4$	KNO_3
	t = 25°C (Fig. 82)				
A	K_2SO_4			4.49	
B	$K_2SO_4 + K_3Na(SO_4)_2$	3.05		4.93	
C	$K_3Na(SO_4)_2 + Na_2SO_4.10H_2O$	12.60		3.61	
D	$Na_2SO_4.10H_2O$	12.75			
E	$Na_2SO_4.10H_2O + Na_2SO_4$	11.79	14.69		
F	$Na_2SO_4 + Na_2SO_4.NaNO_3.H_2O$	10.77	16.54		
G	$Na_2SO_4.NaNO_3.H_2O + NaNO_3$	2.70	34.26		
H	$NaNO_3$		34.78		
I	$NaNO_3 + KNO_3$		38.47		14.79
J	KNO_3				12.44
K	$KNO_3 + K_2SO_4$			2.31	10.78
P	$KNO_3 + K_2SO_4 + K_3Na(SO_4)_2$		4.39	3.48	10.21
Q	$KNO_3 + K_3Na(SO_4)_2$ + "T"*		32.05	6.52	6.69

Continued on p. 325

SO_4^{--} NO_3^- Na^+ (255)

$H_2O + NaNO_3 + Na_2SO_4$; *v.* Fig. 81

	Solid phases	Liquid phase									
		t = 10°C		t = 20°C		t = 25°C (Fig. 81)		t = 30°C		t = 34°C	
		% $NaNO_3$	% Na_2SO_4	% $NaNO_3$	% Na_2SO_4	% $NaNO_3$	% Na_2SO_4	% $NaNO_3$	% Na_2SO_4	% $NaNO_3$	% Na_2SO_4
A	$NaNO_3$	44.60		46.80		47.47				49.31*	
	$NaNO_3 + Na_2SO_4.10H_2O$	42.54	2.96								
B	$NaNO_3 + NaNO_3.Na_2SO_4.H_2O$			44.41	3.30	46.13	3.14	46.35	2.94	47.66	2.51
	$NaNO_3.Na_2SO_4.H_2O$			41.69	4.18	42.86	4.04	45.25	3.19	45.83	3.06
				37.42	6.22	41.30	4.54	43.03	3.86	41.99	4.58
C				34.53	7.70	35.63	7.01				
						33.77	8.33				
D	$NaNO_3.Na_2SO_4.H_2O + 3NaNO_3.4Na_2SO_4$					32.53	9.18	41.83	4.48		
										t = 35°C	
	$3NaNO_3.2Na_2SO_4 + NaNO_3$									48.01	2.56
	$3NaNO_3.2Na_2SO_4$									42.06	3.35
	$3NaNO_3.2Na_2SO_4 + 3NaNO_3.4Na_2SO_4$									40.48	4.12
	$3NaNO_3.4Na_2SO_4$					26.15	13.53			37.87	2.51
E	$3NaNO_3.4Na_2SO_4 + Na_2SO_4$					25.65	14.28			29.77	9.52
	Na_2SO_4										32.54
G	$Na_2SO_4 + Na_2SO_4.10H_2O$					23.34	15.68				
	$NaNO_3.Na_2SO_4.H_2O + Na_2SO_4.10H_2O$			33.80	8.74						
	$Na_2SO_4.10H_2O$	41.20	2.87	33.75	8.63	12.96	16.67				
		32.25	3.13	9.67	13.55		21.88				
H			8.26		16.25						

* Per cent $NaNO_3$ at 35°C.

SO_4^{--} NO_3^- Na^+ K^+.—*(Continued from p. 324)*

	Solid phases	Liquid phase—M per 1000M H_2O			
		$0.5Na_2SO_4$	$NaNO_3$	$0.5K_2SO_4$	KNO_3
	t = 25°C.—Continued				
R	KNO_3 + "T" + $NaNO_3$	2.79	37.83		15.09
S	$K_3Na(SO_4)_2$ + "T" + $Na_2SO_4.NaNO_3.H_2O$		37.27	9.27	1.67
U	$NaNO_3$ + "T" + $Na_2SO_4.NaNO_3.H_2O$	4.18	31.50		2.40
V	$K_3Na(SO_4)_2 + Na_2SO_4 + Na_2SO_4.NaNO_3.H_2O$	10.45	17.64	4.99	
W	$Na_2SO_4 + K_3Na(SO_4)_2 + Na_2SO_4.10H_2O$	11.11	10.58	2.85	
	t = 90°C				
	K_2SO_4			4.85	
	$K_2SO_4 + K_3Na(SO_4)_2$	5.56		7.35	
	$K_3Na(SO_4)_2 + Na_2SO_4$	19.12		4.80	
	Na_2SO_4	19.47			
	$Na_2SO_4 + NaNO_3$	2.99	57.72		
	$NaNO_3$		63.33		
	$NaNO_3 + KNO_3$		83.49		84.60
	KNO_3				64.67
	$KNO_3 + K_2SO_4$			0.68	63.10
	$KNO_3 + K_2SO_4 + K_3Na(SO_4)_2$		18.61	2.64	66.12
	$KNO_3 + NaNO_3 + K_3Na(SO_4)_2$		85.58	3.69	79.04
	$K_3Na(SO_4)_2 + NaNO_3 + Na_2SO_4$		67.05	3.00	39.10

* "T" represents a solid whose composition was not determined.

SO_4^{--} NO_3^- K^+

$H_2O + KNO_3 + K_2SO_4$ (120, 158, 255)

Solid phases	Liquid phase*							
	t = 15°C		t = 25°C		t = 35°C		t = 90°C	
	% K_2SO_4	% KNO_3	% K_2SO_4	% KNO_3	% K_2SO_4	% KNO_3	% K_2SO_4	% KNO_3
K_2SO_4			10.74	0	12.17	0	18.57	0
			8.85	4.82	6.47	16.29		
			6.89	11.05				
$K_2SO_4+KNO_3$	4.35	18.35	3.94	25.49	3.39	30.76	0.63	65.92
			4.45	23.99				
KNO_3			1.98	26.01	1.17	32.61		66.90
			0	27.97	0	34.76		

* Results for 15 and 25°C from Euler (120) recalculated from g per 100g H_2O; for 35°C from Massink; for 25 and 90°C from Hamid.

SO_4^{--} NH_4^+ (96, 107)

$H_2O + H_2SO_4 + NH_4OH$; *v.* Fig. 83

t = 25°C (96)

	Solid phases	Liquid phase—M per 1000g soln.	
		SO_3	$(NH_4)_2O$
A	(?)	10.43	0.894
B	$(NH_4)HS_2O_7$ + (?)	9.67	1.260
C	$(NH_4)HS_2O_7$	9.60	0.977
D	$(NH_4)H_3(SO_4)_2$	8.00m	1.42m
		7.99	1.38
E	$(NH_4)HSO_4 + (NH_4)H_3(SO_4)_2$	6.43	2.50
	$(NH_4)HSO_4$	6.47	1.55
F		5.66	1.22
		4.85	1.60
G		4 29	2.17

SO_4^{--} NH_4^+.—(Continued)

$t = 30°C$ (107)

% $(NH_4)_2SO_4$	% H_2SO_4
$(NH_4)_2SO_4$	
43.59	10.63
$(NH_4)_2SO_4 + 3(NH_4)_2SO_4.H_2SO_4$	
42.06	16.67
$3(NH_4)_2SO_4.H_2SO_4$	
44.63	32.32
45.50	33.12
$(NH_4)HSO_4$	
45.31	33.96
35.37	38.51
24.30	45.77
16.98	56.55
24.40	62.46
29.75	62.83
33.70	62.59
36.95	62.23

SO_4^{--} NH_4^+ (98, 124)

$H_2O + NH_4OH + (NH_4)_2SO_4$

$t = 25°C$ (98)

M per 1000g soln.

NH_4OH	$(NH_4)_2SO_4$
$(NH_4)_2SO_4$	
0.0	3.28*
2.04	2.60
3.90	2.13
6.88	1.59
10.70	1.16
14.26	0.78
18.94*	0.0

* Work of other investigators.

SO_4^{--} NH_4^+ $C_2O_4^{--}$ (82)

$H_2O + (NH_4)_2SO_4 + (NH_4)_2C_2O_4$

°C	A*	B†
18	42.43	0.11
50	45.92	0.65

*A = % $(NH_4)_2SO_4$.

† B = % $(NH_4)_2C_2O_4$. Solid phase is $(NH_4)_2SO_4 + (NH_4)_2C_2O_4.H_2O$.

SO_4^{--} NH_4^+ HCO_3^-

$H_2O + (NH_4)_2SO_4 + (NH_4)HCO_3$

$t = 15°C$ (279)

% $(NH_4)HCO_3$	% $(NH_4)_2SO_4$
$(NH_4)HCO_3$	
15.73	0.0
12.66	6.96
11.33	10.66
9.22	16.95
7.88	21.48
6.60	26.12
5.72	29.45
4.73	34.04
3.67	38.39
$(NH_4)HCO_3 + (NH_4)_2SO_4$	
3.69	39.90
$(NH_4)_2SO_4$	
0.0	42.44

$t = 35°C$ (124)

% $(NH_4)HCO_3$*	% $(NH_4)_2SO_4$*
$(NH_4)HCO_3$	
23.72	0
15.13	18.94
13.37	23.48
9.79	32.64
$(NH_4)HCO_3 + (NH_4)_2SO_4$	
8.13	39.60
$(NH_4)_2SO_4$	
5.43	41.23
0	44.67

* Under a pressure of 3 atm. of CO_2.

SO_4^{--} NH_4^+ HCO_3^- Na^+ (279)*

$H_2O + (NH_4)HCO_3 + Na_2SO_4$; *v.* Figs. 84, 85, 86

	Solid phases	Liquid phase—M per 1000M H_2O: $(NH_4)HCO_3$	$0.5Na_2SO_4$	$0.5(NH_4)_2SO_4$	$NaHCO_3$
	$t = 15°C$; *v.* Fig. 84				
A	$Na_2SO_4.10H_2O$		33.22		
B	$Na_2SO_4.10H_2O + Na_2SO_4.(NH_4)_2SO_4.4H_2O$		63.08	90.28	
C	$Na_2SO_4.(NH_4)_2SO_4.4H_2O + (NH_4)_2SO_4$		27.48	189.72	
D	$(NH_4)_2SO_4$			201.00	
E	$(NH_4)_2SO_4 + (NH_4)HCO_3$	14.91		192.8	
F	$(NH_4)HCO_3$	42.52			
G	$(NH_4)HCO_3 + NaHCO_3$	38.92			12.79
H	$NaHCO_3$				18.53
	$t = 15°C$.—(Continued)				
I	$NaHCO_3 + Na_2SO_4.10H_2O$		28.36		12.75
P	$Na_2SO_4.10H_2O + NaHCO_3 + Na_2SO_4.(NH_4)_2SO_4.4H_2O$		52.44	91.72	12.84
Q	$NaHCO_3 + (NH_4)HCO_3 + Na_2SO_4.(NH_4)_2SO_4.4H_2O$		24.92	134.16	20.90
R	$(NH_4)HCO_3 + (NH_4)_2SO_4 + Na_2SO_4.(NH_4)_2SO_4.4H_2O$		13.58	195.98	14.96
	$t = 30°C$; *v.* Fig. 85				
A	$Na_2SO_4.10H_2O$		104.02		
B	$Na_2SO_4.10H_2O + Na_2SO_4$		123.26	27.50	
C	$Na_2SO_4 + Na_2SO_4.(NH_4)_2SO_4.4H_2O$		110.60	66.36	
D	$Na_2SO_4.(NH_4)_2SO_4.4H_2O + (NH_4)_2SO_4$		40.42	197.46	
E	$(NH_4)_2SO_4$			212.4	
F	$(NH_4)_2SO_4 + (NH_4)HCO_3$	24.6		198.54	
G	$(NH_4)HCO_3$	59.57			
H	$(NH_4)HCO_3 + NaHCO_3$	37.96			12.38
I	$NaHCO_3$				23.61
J	$NaHCO_3 + Na_2SO_4.10H_2O$		97.68		8.55
P	$NaHCO_3 + Na_2SO_4.10H_2O + Na_2SO_4$		114.50	29.16	7.09
Q	$Na_2SO_4 + NaHCO_3 + Na_2SO_4.(NH_4)_2SO_4.4H_2O$		110.06	63.66	7.85
R	$NaHCO_3 + (NH_4)HCO_3 + Na_2SO_4.(NH_4)_2SO_4.4H_2O$		22.54	174.08	27.56
S	$(NH_4)HCO_3 + (NH_4)_2SO_4 + Na_2SO_4.(NH_4)_2SO_4.4H_2O$		17.36	208.12	24.66
	$t = 40°C$				
	Na_2SO_4		122.02		
	$Na_2SO_4 + Na_2SO_4.(NH_4)_2SO_4.4H_2O$		102.6	94.6	
	$Na_2SO_4.(NH_4)_2SO_4.4H_2O + (NH_4)_2SO_4$		50.0	204.8	
	$(NH_4)_2SO_4$			221.2	
	$(NH_4)_2SO_4 + (NH_4)HCO_3$	34.0		201.8	
	$(NH_4)HCO_3$	75.77			
	$(NH_4)HCO_3 + NaHCO_3$	70.83			15.84
	$NaHCO_3$				26.92
	$NaHCO_3 + Na_2SO_4$		114.28		9.45
	$Na_2SO_4 + NaHCO_3 + Na_2SO_4.(NH_4)_2SO_4.4H_2O$		98.66	90.82	11.26
	$NaHCO_3 + (NH_4)HCO_3 + Na_2SO_4.(NH_4)_2SO_4.4H_2O$		20.06	218.2	34.59
	$(NH_4)HCO_3 + (NH_4)_2SO_4 + Na_2SO_4.(NH_4)_2SO_4.4H_2O$		19.58	218.4	35.49
	$t = 15°C$ (124)				
	$Na_2SO_4.10H_2O$				1.86
	$Na_2SO_4.10H_2O + NH_4NaSO_4.3H_2O$†		4.96		3.70
	$NH_4NaSO_4.3H_2O + (NH_4)_2SO_4$		10.56		1.80
	$(NH_4)_2SO_4$		11.12		
	$t = 35°C$ (124)‡; (*v.* Fig. 86)				
A	Na_2SO_4				6.98
B	$Na_2SO_4 + NH_4NaSO_4.3H_2O$		4.66		5.92
C	$NH_4NaSO_4.3H_2O + (NH_4)_2SO_4$		11.08		2.82
D	$(NH_4)_2SO_4$		12.22		
E	$(NH_4)_2SO_4 + (NH_4)HCO_3$	1.96	10.48		

SO_4^{--} NH_4^+ HCO_3^- Na^+.*—(*Continued*)

	Solid phases	Liquid phase—M per 1000M H_2O: $(NH_4)HCO_3$	$0.5Na_2SO_4$	$0.5(NH_4)_2SO_4$	$NaHCO_3$
	t = 35°C.—(*Continued*)				
F	$(NH_4)HCO_3$	3.93			
G	$(NH_4)HCO_3 + NaHCO_3$	3.72		0.84	
		1.82	3.43	1.39	
			8.86	2.20	
P	$NaHCO_3 + NH_4NaSO_4.3H_2O + Na_2SO_4$		4.56	0.50	5.41
	$NaHCO_3 + NH_4NaSO_4.3H_2O$		6.54	0.80	3.56
			8.89	1.27	2.11
Q	$NaHCO_3 + (NH_4)_2SO_4 + NH_4NaSO_4.3H_2O$		11.18	1.76	1.25
R	$(NH_4)HCO_3 + NaHCO_3 + (NH_4)_2SO_4$		11.34	1.90	1.08

* All determinations made under decomposition pressure of $(NH_4)HCO_3$.
† The correct formula of this salt is probably that given by Nishizawa, namely, $(NH_4)_2SO_4.Na_2SO_4.4H_2O$. ‡ Under pressure of 3 atm. CO_2.

SO_4^{--} NH_4^+ $C_2H_3O_2^-$ Pb^{++}
$H_2O + NH_4C_2H_3O_2 + PbSO_4$
t = 25°C (254)

% $NH_4C_2H_3O_2$*	% $PbSO_4$†
$PbSO_4$	
0.00	0.0041
0.796	0.0636
1.591	0.137
3.170	0.304
5.340	0.560
10.69	1.680
21.37	3.890

SO_4^{--} NH_4^+ $C_2H_3O_2^-$ Ca^{++}
$H_2O + NH_4C_2H_3O_2 + CaSO_4$
t = 25°C (254)

% $NH_4C_2H_3O_2$*	% $CaSO_4$†
$CaSO_4.2H_2O$	
0.0	0.2085
2.13	0.454
5.34	0.752
10.68	1.146
21.37	1.755

SO_4^{--} NH_4^+ $C_2H_3O_2^-$ Sr^{++}
$H_2O + NH_4C_2H_3O_2 + SrSO_4$
t = 25°C (254)

% $NH_4C_2H_3O_2$*	% $SrSO_4$†
$SrSO_4$	
0.00	0.0151
2.13	0.0451
5.34	0.0732
10.68	0.0942
21.37	0.1150

SO_4^{--} NH_4^+ Th^{++++}
$H_2O + (NH_4)_2SO_4 + Th(SO_4)_2$
t = 16°C (21)
g per 100g H_2O

$(NH_4)_2SO_4$	$Th(SO_4)_2$
$Th(SO_4)_2.?H_2O$	
2.13	3.361
4.80	5.269
10.02	8.947
16.56	13.33
28.00	10.359
35.20	9.821
45.14	6.592
49.05	5.750
52.88	4.583
69.74	1.653

SO_4^{--} NH_4^+ Zn^{++} Cu^{++}
$H_2O + (NH_4)_2SO_4 + ZnSO_4 + CuSO_4$; *t* = 13–14°C (129)

Solid phase—M%: $(NH_4)_2SO_4.CuSO_4.6H_2O$	$(NH_4)_2SO_4.ZnSO_4.6H_2O$	Liquid phase—M per 1000M H_2O: $(NH_4)_2SO_4.CuSO_4.6H_2O$	$(NH_4)_2SO_4.ZnSO_4.6H_2O$
2.39	97.61	0.422	8.069
4.52	95.48	0.666	5.638
9.03	90.97	1.218	5.115
14.67	85.33	2.130	4.924
22.62	77.38	3.216	4.022
100.0	0.0	10.350	0.0

* Before saturation. † After saturation.

SO_4^{--} NH_4^+ Cu^{++} (73, 335, 338): $H_2O + (NH_4)_2SO_4 + CuSO_4$

Solid phases	Liquid phase—M per 1000g H_2O (73): *t* = 25°C, $CuSO_4$	*t* = 25°C, $(NH_4)_2SO_4$	*t* = 51°C, $CuSO_4$	*t* = 51°C, $(NH_4)_2SO_4$	*t* = 61°C, $CuSO_4$	*t* = 61°C, $(NH_4)_2SO_4$
$CuSO_4.5H_2O$	1.410		2.073		2.419	
	1.470	0.096				
	1.486	0.121				
	1.494	0.158				
	1.513	0.183				
	1.558	0.293				
$CuSO_4.5H_2O + CuSO_4.(NH_4)_2SO_4.6H_2O$	1.646	0.534	2.365	0.861	2.753	0.998
$CuSO_4.(NH_4)_2SO_4.6H_2O$	1.413	0.572	1.302	1.351	1.631	1.695
	1.368	0.575			0.396	5.387
	1.259	0.601				
	0.779	0.779				
	0.565	0.897				
	0.507	0.989				
	0.112	3.233				
$CuSO_4.(NH_4)_2SO_4.6H_2O + (NH_4)_2SO_4$	0.070	3.826	0.180	6.733	0.249	7.079
$(NH_4)_2SO_4$	0.051	5.715		6.462		6.714
	0.042	5.762				
		5.801				

°C (335)	Solid phases	Liquid phase—M per 100M H_2O: $(NH_4)_2SO_4$	$CuSO_4$
− 1.5	$CuSO_4.5H_2O$ + Ice		1.31
− 2.6	$CuSO_4.5H_2O + (NH_4)_2SO_4.CuSO_4.6H_2O$ + Ice	0.24	1.88
− 1.7	$CuSO_4.(NH_4)_2SO_4.6H_2O$ + Ice	0.68	0.68
− 4.2		2.33	0.102
− 7.2		3.80	0.05
−19.0	$(NH_4)_2SO_4 + (NH_4)_2SO_4.CuSO_4.6H_2O$ + Ice	9.7	

t = 30°C (338)

% $(NH_4)_2SO_4$	% $CuSO_4$
$(NH_4)_2SO_4$	
44.00	0.0
$(NH_4)_2SO_4 + (NH_4)_2SO_4.CuSO_4.6H_2O$	
43.29	0.49
$(NH_4)_2SO_4.CuSO_4.6H_2O$	
38.32	0.77
29.27	1.57
17.53	4.05
9.33	11.03

% $(NH_4)_2SO_4$	% $CuSO_4$
$(NH_4)_2SO_4.CuSO_4.6H_2O$	
8.19	13.65
6.98	16.77
$(NH_4)_2SO_4.CuSO_4.6H_2O + CuSO_4.5H_2O$	
5.79	20.53
$CuSO_4.5H_2O$	
2.45	20.19
0.9	20.32

SO_4^{--} NH_4^+ Cu^{++} Ni^{++}
$H_2O + (NH_4)_2SO_4 + CuSO_4 + NiSO_4$
t = 13–14°C (129)

Solid phase—M%: $(NH_4)_2SO_4.CuSO_4.6H_2O$	$(NH_4)_2SO_4.NiSO_4.6H_2O$	Liquid phase—M per 1000M H_2O: $(NH_4)_2SO_4.CuSO_4.6H_2O$	$(NH_4)_2SO_4.NiSO_4.6H_2O$
0.00	100.00	0.00	5.210
3.51	96.49	0.576	3.450
10.29	89.71	1.476	2.950
30.59	69.41	2.664	2.089
44.26	55.47	3.693	1.809

SO_4^{--} NH_4^+ Cu^{++} Ni^{++}.—(*Continued*)

Solid phase—M %		Liquid phase—M per 1000M H_2O	
$(NH_4)_2SO_4$.-$CuSO_4.6H_2O$	$(NH_4)_2SO$.-$NiSO_4.6H_2O$	$(NH_4)_2SO_4$.-$CuSO_4.6H_2O$	$(NH_4)_2SO_4$.-$NiSO_4.6H_2O$
52.23	47.77	4.165	1.449
76.73	23.27	4.631	1.251
78.80	21.20	4.785	1.202
100.00	0.00	10.350	0.00

SO_4^{--} NH_4^+ Cu^{++} Li^+

$H_2O + (NH_4)_2SO_4 + CuSO_4 + Li_2SO_4$; *v.* Fig. 87

$t = 30°C$ (338)

	Solid phases	Liquid phase % $(NH_4)_2SO_4$	% $CuSO_4$	% Li_2SO_4
A	$(NH_4)_2SO_4$	44.0		
B	$(NH_4)_2SO_4 + (NH_4)_2SO_4.CuSO_4.6H_2O$	43.29	0.49	
C	$(NH_4)_2SO_4.CuSO_4.6H_2O + CuSO_4.5H_2O$	2.79	20.53	
D	$CuSO_4.5H_2O$		20.32	
E	$CuSO_4.5H_2O + Li_2SO_4.H_2O$		10.05	20.55
F	$Li_2SO_4.H_2O$			25.24
G	$Li_2SO_4.H_2O + NH_4LiSO_4$	12.46		21.88
H	$NH_4LiSO_4 + (NH_4)_2SO_4$	39.55		6.59
P	$(NH_4)_2SO_4 + NH_4LiSO_4 + (NH_4)_2SO_4$.-$CuSO_4.6H_2O$	39.98	0.37	6.18
Q	$NH_4LiSO_4 + Li_2SO_4.H_2O + (NH_4)_2SO_4$.-$CuSO_4.6H_2O$	12.56	2.51	20.51
R	$Li_2SO_4.H_2O + CuSO_4.5H_2O + (NH_4)_2SO_4$.-$CuSO_4.6H_2O$	5.14	10.68	18.08

SO_4^{--} NH_4^+ Cu^{++} K^+

$H_2O + (NH_4)_2SO_4 + CuSO_4 + K_2SO_4$; *v.* Fig. 88

$t = 25°C$ (169)

	Solid phases	Liquid phase—M per 100M of dissolved salts			
		$(NH_4)_2$-SO_4	$CuSO_4$	K_2SO_4	H_2O
A	$CuSO_4.5H_2O + CuSO_4.(NH_4)_2SO_4.6H_2O$	24.86	75.14		2570
	$CuSO_4.5H_2O$ + Solid soln. I*	22.68	75.63	1.69	2589
		19.89	77.02	3.09	2640
		16.30	87.38	5.32	2717
		13.15	79.62	7.23	2778
		8.56	83.14	8.30	2907
		4.41	85.23	10.36	3011
B	$CuSO_4.5H_2O + CuSO_4.K_2SO_4.6H_2O$		88.22	11.78	3149
C	$(NH_4)_2SO_4 + CuSO_4.(NH_4)_2SO_4.6H_2O$	99.30	0.70		955
	Solid soln. I* + Solid soln. II†	92.39	0.88	6.73	1071
		82.56	2.20	15.24	1604
		71.66	3.59	24.75	2140
		56.02	5.60	38.38	3091
		43.01	7.28	49.76	3922
		31.35	8.46	60.19	4628
		15.26	9.93	74.81	5610
D	$K_2SO_4 + CuSO_4.K_2SO_4.6H_2O$		11.27	88.73	6741

* Solid soln. I $CuSO_4.(K, NH_4)_2SO_4.6H_2O$. † Solid soln. II $(K, NH_4)_2SO_4$.

SO_4^{--} NH_4^+ Fe^{++}

$H_2O + (NH_4)_2SO_4 + FeSO_4$; *v.* Fig. 89

$t = 30°C$ (343)

	Solid phases	Liquid phase % $(NH_4)_2SO_4$	% $FeSO_4$
A	$FeSO_4.7H_2O$		24.90
		5.24	25.24
B	$(NH_4)_2SO_4.FeSO_4.6H_2O + FeSO_4$.-$7H_2O$	5.91*	25.24*

SO_4^{--} NH_4^+ Fe^{++}.—(*Continued*)

	Solid phases	Liquid phase % $(NH_4)_2SO_4$	% $FeSO_4$
	$(NH_4)_2SO_4.FeSO_4.6H_2O$	6.44	23.59
		8.90	17.64
C		11.45	13.13
		16.29	7.95
D		19.64	5.70
		34.24	1.72
E	$(NH_4)_2SO_4 + (NH_4)_2SO_4.FeSO_4$.-$6H_2O$	43.88*	0.79*
F	$(NH_4)_2SO_4$	44.27	

* Average of two or more results.

SO_4^{--} NH_4^+ Fe^{++} Mg^{++} (403)

$H_2O + (NH_4)_2SO_4 + FeSO_4 + MgSO_4$

Author determined the solubilities of solid solutions of $(NH_4)_2$-$SO_4.MgSO_4.6H_2O$ and $(NH_4)_2SO_4.FeSO_4.6H_2O$ between 0 and 6°C. He found that these compounds form a continuous series of solid solutions and that the ratio of the two solids in these solid solutions was nearly the same as the ratio of the component salts in the solution with which these solids were in equilibrium.

SO_4^{--} NH_4^+ Fe^{++} Li^+

$H_2O + (NH_4)_2SO_4 + FeSO_4 + Li_2SO_4$; *v.* Fig. 90

$t = 30°C$ (343)

	Solid phases	Liquid phase % $(NH_4)_2$-SO_4	% $FeSO_4$	% Li_2SO_4
A	$FeSO_4.7H_2O$		24.87	
B	$FeSO_4.7H_2O + Li_2SO_4.H_2O$		16.10	16.50
C	$Li_2SO_4.H_2O$			25.10
D	$Li_2SO_4.H_2O + LiNH_4SO_4$	12.46		21.88
E	$LiNH_4SO_4 + (NH_4)_2SO_4$	39.55		6.59
F	$(NH_4)_2SO_4$	44.27		
G	$(NH_4)_2SO_4 + (NH_4)_2SO_4.FeSO_4.6H_2O$	43.86	0.79	
H	$(NH_4)_2SO_4.FeSO_4.6H_2O + FeSO_4.7H_2O$	5.93	25.22	
P	$FeSO_4.7H_2O + Li_2SO_4.H_2O + (NH_4)_2SO_4$.-$FeSO_4.6H_2O$	4.82	16.85	15.62
Q	$Li_2SO_4.H_2O + (NH_4)_2SO_4.FeSO_4.6H_2O +$ NH_4LiSO_4	12.32	4.15	20.03
R	$(NH_4)_2SO_4.FeSO_4.6H_2O + NH_4LiSO_4 +$ $(NH_4)_2SO_4$	40.48	0.61	6.23

SO_4^{--} NH_4^+ CrO_4^{--}

$H_2O + (NH_4)_2SO_4 + (NH_4)_2CrO_4$

$t = 25°C$ (10)

Solid phases		Liquid phase	
	M % $(NH_4)_2$-CrO_4	% $(NH_4)_2$-SO_4	% $(NH_4)_2$-CrO_4
$(NH_4)_2SO_4$	0	43.41	0.0
Solid soln. I*	2.68	39.73	3.67
Solid soln. II†	5.98	39.13	4.22
	8.47	39.11	4.23
	18.86	39.96	4.36
	25.88	37.72	4.51
	40.25	38.06	4.88
	60.25	34.82	6.98
	82.26	30.81	9.06
	92.57	26.81	11.73
	96.91	17.13	16.76
	98.91	14.97	17.76
	99.81	2.78	23.22
$(NH_4)_2CrO_4$	100.00	0.0	25.16

* Solid soln. I contains from 0 to 2.90M % $(NH_4)_2CrO_4$.

† Solid soln. II contains from about 21.5 to 100M % $(NH_4)_2CrO_4$.

SO_4^{--} NH_4^+ CrO_4^{--} K^+

$H_2O + (NH_4)_2SO_4 + K_2CrO_4$

$t = 25°C$ (215.5)

Composition of liquid phase in moles, in equilibrium with two solid solutions (I and II), also in moles

Solid soln. I				Solid soln. II				Liquid phase				
$(NH_4)_2$	K_2	SO_4	CrO_4	$(NH_4)_2$	K_2	SO_4	CrO_4	$(NH_4)_2$	K_2	SO_4	CrO_4	H_2O
100	0	97.1	2.9	100	0	78.5	21.5	100	0	91.44	8.56	971
73.75	26.25	92.29	7.71	98.28	1.72	11.88	88.12	91.51	8.49	79.37	20.63	1064
42.14	57.86	88.89	11.11	96.72	3.28	11.37	88.63	88.12	11.88	69.32	30.68	1246
24.15	75.85	84.93	15.07	92.86	7.14	9.39	90.61	77.30	22.70	41.15	58.85	1485
21.07	78.93	77.32	22.68	89.86	10.14	7.17	92.83	66.05	33.95	21.29	78.71	1485
17.57	82.43	71.66	58.59	69.42	30.58	6.40	93.60	59.51	40.49	14.19	85.81	1501
37.56	62.44	41.41	85.39	60.20	39.81	9.38	91.67	52.04	47.96	9.79	90.21	1508
37.41	62.59	14.61		48.16	51.84	7.83	92.17	42.61	57.39	7.59	92.41	1571
				49.76	50.24	3.30	96.70	45.17	54.83	3.63	96.37	1524
16.76	83.24	0	100	55.50	44.50	100	0	61.66	38.34	0	100	1682

SO_4^{--} NH_4^+ $B_4O_7^{--}$ (326, 331)

$H_2O + (NH_4)_2SO_4 + (NH_4)_2B_4O_7$

Solid phases	Liquid phase									
	$t = 10°C$		$t = 20°C$		$t = 25°C$		$t = 35°C$		$t = 50°C$	
	% $(NH_4)_2$-B_4O_7	% $(NH_4)_2$-SO_4	% $(NH_4)_2$-B_4O_7	% $(NH_4)_2$-SO_4	% $(NH_4)_2$-B_4O_7	% $(NH_4)_2$-SO_4	% $(NH_4)_2$-B_4O_7	% $(NH_4)_2$-SO_4	% $(NH_4)_2$-B_4O_7	% $(NH_4)_2$-SO_4
$(NH_4)_2B_4O_7.4H_2O$	5.26		7.63*		9.00		13.02		20.88	
	3.02	8.29	6.39	3.25	6.75	5.17	11.80	1.59	13.73	16.31
	1.81	37.09	4.35	11.97	4.05	23.87	7.41	14.92	10.01	31.29
			2.48	38.37	3.14*	37.19*	5.88*	25.19*		
$(NH_4)_2B_4O_7.4H_2O + (NH_4)_2SO_4$	1.61*	41.09*	2.36*	41.41*	2.83*	41.62*	4.21*	41.56*	8.55*	41.19*
$(NH_4)_2SO_4$		42.20		42.99	2.02	42.17	1.69*	43.17*	8.63	41.11
					0.65*	43.06*		44.23*		45.77
						43.42*				

* Mean of more than one determination.

Invariant points

°C	Solid phases	% $(NH_4)_2B_4O_7$	% $(NH_4)_2SO_4$
− 1.07	$(NH_4)_2B_4O_7.4H_2O$ + Ice	3.62	
−19.91	$(NH_4)_2SO_4 + (NH_4)_2B_4O_7.4H_2O$ + Ice	0.78	39.38
−19.05	$(NH_4)_2SO_4$ + Ice		39.75

SO_4^{--} NH_4^+ $B_4O_7^{--}$ Na^+; *v.* p. 330, 331

SO_4^{--} NH_4^+ La^{+++}; SO_4^{--} NH_4^+ Ce^{+++}; SO_4^{--} NH_4^+ Sa^{+++}; *v.* p. 331

SO_4^{--} NH_4^+ Gl^{++} (Be^{++})

$H_2O + (NH_4)_2SO_4 + GlSO_4$ (= $BeSO_4$)

$t = 25°C$ (43); *v.* Fig. 94

	Solid phases	Liquid phase	
		% $(NH_4)_2$-SO_4	% $GlSO_4$
A	$(NH_4)_2SO_4$	43.45	0
		38.60	8.62
B		35.88	16.04
C	$(NH_4)_2SO_4 + (NH_4)_2SO_4.GlSO_4.2H_2O$	37.56	19.72
	$(NH_4)_2SO_4.GlSO_4.2H_2O$	34.26	22.08
		32.20	24.04
D	$(NH_4)_2SO_4.GlSO_4.2H_4O + GlSO_4.4H_2O$	28.09	26.79
E	$GlSO_4.4H_2O$	24.99	26.68
		15.66	27.26
		5.77	28.56
F		0	29.94

SO_4^{--} NH_4^+ Mg^{++} (393)

$H_2O + (NH_4)_2SO_4 + MgSO_4$; *v.* Fig. 95

	Solid phases	Liquid phase			
		$t = 30°C$		$t = 60°C$	
		% $(NH_4)_2$-SO_4	% $MgSO_4$	% $(NH_4)_2$-SO_4	% $MgSO_4$
A	$(NH_4)_2SO_4$	43.60	0.0	46.80	0.0
B*	$(NH_4)_2SO_4 + (NH_4)_2SO_4.MgSO_4.6H_2O$				
C	$(NH_4)_2SO_4.MgSO_4.6H_2O$	41.20	0.30		
D		26.15	1.25	26.77	4.68
E		19.17	3.01	24.37	5.06
F		10.55	7.30	14.27	11.92
G		9.57	8.71	13.88	12.65
H		8.97	9.66	11.91	15.04
I		6.31	16.53	5.85	26.85
J		4.55	20.20	3.98	31.10
K		2.98	27.60		
L*	$MgSO_4.7H_2O + (NH_4)_2SO_4.MgSO_4.6H_2O$				
M	$MgSO_4.7H_2O$	0.0	29.03	0.0	35.24

* Not realized experimentally: position on diagram indicated roughly.

$SO_4^{--}-NH_4^{+}B_4O_7^{--}-Na^{+}$ (325, 326, 328, 332)

$H_2O + (NH_4)_2SO_4 + Na_2B_4O_7$; *v.* Figs. 91, 92, 93

	Solid phases	Liquid phase—M per 1000M H_2O†																							
		t = −16°C				t = −10°C				t = 0°C (*v.* Fig. 91)				t = 10°C				t = 15°C				t = 25°C (*v.* Fig. 92)			
		0.5A	0.5B	0.5C	0.5D	0.5A	0.5B	0.5C	0.5D	0.5A	0.5B	0.5C	0.5D	0.5A	0.5B	0.5C	0.5D	0.5A	0.5B	0.5C	0.5D	0.5A	0.5B	0.5C	0.5D
F	$(NH_4)_2SO_4$	182.8				186.0				192.41				199.07				202.22				208.93			
	$(NH_4)_2SO_4 + Na_2SO_4.10H_2O + Na_2SO_4.(NH_4)_2SO_4.4H_2O$	173.6	13.50																						
	$(NH_4)_2SO_4 + (NH_4)_2B_4O_7.4H_2O + Na_2B_4O_7.10H_2O$	166.9	13.50	2.60																					
C	$Na_2SO_4.10H_2O$										12.68				23.34				33.46				71.11		
H	$(NH_4)_2B_4O_7.4H_2O$											7.31				10.41				12.89				18.59	
A	$Na_2B_4O_7.10H_2O$												1.98				2.91				3.85				5.69
D	$Na_2SO_4.10H_2O + (NH_4)_2SO_4.Na_2SO_4.4H_2O$					153.00	19.72			127.0	30.50			103.6	49.0			90.80	58.00			60.4	103.60		
E	$(NH_4)_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$					178.40	16.06			182.0	19.80			186.0	25.0			189.80	27.50			193.60	37.0		
G	$(NH_4)_2SO_4 + (NH_4)_2B_4O_7.4H_2O$	180.8		3.60		184.0		4.90		189.0		5.0		195.45		5.26		198.40		6.50		204.23		9.56	
I	$Na_2B_4O_7.10H_2O + (NH_4)_2B_4O_7.4H_2O$											6.59	1.66			9.80	2.35			12.80	3.22			19.88	6.25
B	$Na_2SO_4.10H_2O + Na_2B_4O_7.10H_2O$										12.67		1.80		23.32		1.38		32.22		2.33		72.27		2.63
R	$(NH_4)_2SO_4.Na_2SO_4.4H_2O + Na_2SO_4.10H_2O + Na_2B_4O_7.10H_2O$	158.95	15.55		2.95	156.12	14.83		3.26	129.73	26.30		4.70	106.39	42.54		5.25	93.0*	59.0*		5.50*	62.64	104.57		5.88
Q	$(NH_4)_2SO_4.Na_2SO_4.4H_2O + (NH_4)_2B_4O_7.4H_2O + Na_2B_4O_7.10H_2O$					157.25	14.33		2.80	132.13	25.0		5.0	116.49	37.15		7.58	113.56	43.80		9.35	114.0	53.18		14.98
	$(NH_4)_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O + Na_2B_4O_7.10H_2O$	160.4	14.60		2.90																				
P	$(NH_4)_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O + (NH_4)_2B_4O_7.4H_2O$					177.55	9.85	2.60		182.92	18.10	4.69		187.65	23.78	6.05		189.25*	27.0*	7.25*		193.89	34.0	10.11	

	Solid phases	t = 35°C				t = 45°C (*v.* Fig. 93)				t = 55°C			
		0.5A	0.5B	0.5C	0.5D	0.5A	0.5B	0.5C	0.5D	0.5A	0.5B	0.5C	0.5D
C	Na_2SO_4		125.33				120.66						
	Na_2SO_4										117.03		
F	$(NH_4)_2SO_4$	216.20				225.0				234.91			
H	$(NH_4)_2B_4O_7.4H_2O$			28.14				42.41				58.34	
A	$Na_2B_4O_7.10H_2O$				9.06				14.47				25.23
	$Na_2B_4O_7.10H_2O + Na_2B_4O_7.5H_2O$*										57.40		19.26
												57.29	48.79
D	$Na_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$	78.40	105.80			114.0	100.0			169.20	91.20		
E	$(NH_4)_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$	201.0	46.50			206.0	57.70			210.0	78.0		
G	$(NH_4)_2SO_4 + (NH_4)_2B_4O_7.4H_2O$	208.94		14.61		218.0		26.50		228.0		38.0	
	$(NH_4)_2B_4O_7.4H_2O + Na_2B_4O_7.5H_2O$											74.73	52.86
I	$(NH_4)_2B_4O_7.4H_2O + Na_2B_4O_7.10H_2O$							49.0	25.0				
	$Na_2SO_4 + Na_2B_4O_7.5H_2O$										108.0		16.26
	$(NH_4)_2B_4O_7.4H_2O + Na_2B_4O_7.10H_2O$			31.14	12.21								
B	$Na_2SO_4 + Na_2B_4O_7.10H_2O$		123.59		4.27		114.57		8.38				
	$(NH_4)_2SO_4.Na_2SO_4.4H_2O + Na_2SO_4 + Na_2B_4O_7.10H_2O$	89.82	89.85		17.57								
P	$(NH_4)_2SO_4.Na_2SO_4.4H_2O + (NH_4)_2SO_4 + (NH_4)_2B_4O_7.4H_2O$					190.65	63.0	31.0		170.22	98.42	60.37	
	$(NH_4)_2SO_4.Na_2SO_4.4H_2O + Na_2SO_4 + (NH_4)_2B_4O_7.4H_2O$									168.61	99.26	60.53	
	$(NH_4)_2SO_4.Na_2SO_4.4H_2O + (NH_4)_2B_4O_7.4H_2O + Na_2B_4O_7.10H_2O$	116.79	60.22		28.19								
	$(NH_4)_2SO_4.Na_2SO_4.4H_2O + (NH_4)_2SO_4 + (NH_4)_2B_4O_7.4H_2O$	195.59	44.41	17.54									
Q	$(NH_4)_2SO_4.Na_2SO_4.4H_2O + Na_2SO_4 + (NH_4)_2B_4O_7.4H_2O$					165.76	76.42	33.25					
S	$Na_2SO_4 + (NH_4)_2B_4O_7.4H_2O + Na_2B_4O_7.5H_2O$					121.44	58.89		52.90	140.63	26.78		94.09
T	$Na_2SO_4 + Na_2B_4O_7.10H_2O + Na_2B_4O_7.5H_2O$*					58.0	89.0		32.50				
R	$(NH_4)_2B_4O_7.4H_2O + Na_2B_4O_7.10H_2O + Na_2B_4O_7.5H_2O$*					93.50	23.51		66.50				

* By interpolation. Data for this system at −16.32, −13, −11.02, 25.06, 38.70, 40, 41, 41.7, 50 and 55.7°C, are also given by the authors.

† 0.5A = $0.5(NH_4)_2SO_4$, 0.5B = $0.5Na_2SO_4$, 0.5C = $0.5(NH_4)_2B_4O_7$, 0.5D = $0.5Na_2B_4O_7$.

SO_4^{--} NH^+ $B_4O_7^{--}$ Na^+.—*(Continued)*

Invariant points

°C	Solid phases	Liquid phase—M per 1000M H_2O† 0.5A	0.5B	0.5C	0.5D
−20.15	$(NH_4)_2SO_4 + Na_2B_4O_7.10H_2O + (NH_4)_2B_4O_7.4H_2O$ + Ice	172	11.50		2.40
−19.60	$(NH_4)_2SO_4 + Na_2SO_4.10H_2O + Na_2B_4O_7.10H_2O$ + Ice	159.30	16.10		2.80
−19.34	$(NH_4)_2SO_4 + (NH_4)_2B_4O_7.4H_2O$ + Ice	179.53		2.44	
−19.50	$(NH_4)_2SO_4 + Na_2SO_4.10H_2O$ + Ice	173.2	13.40		
−19.05	$(NH_4)_2SO_4$ + Ice	180			
−16.32	$(NH_4)_2SO_4 + Na_2SO_4.10H_2O + (NH_4)_2SO_4.Na_2SO_4.4H_2O + Na_2B_4O_7.10H_2O$	158.92	15.78		2.93
−16.0	$(NH_4)_2SO_4 + Na_2SO_4.10H_2O + (NH_4)_2SO_4.Na_2SO_4.4H_2O$	173.60	13.50		
−11.02	$(NH_4)_2SO_4.Na_2SO_4.4H_2O + (NH_4)_2SO_4 + (NH_4)_2B_4O_7.4H_2O + Na_2B_4O_7.10H_2O$	180.10	6.90		2.70
− 1.38	$Na_2B_4O_7.10H_2O + Na_2SO_4.10H_2O$ + Ice		10.16		1.15
− 1.22	$(NH_4)_2B_4O_7.4H_2O + Na_2B_4O_7.10H_2O$ + Ice			6.81	1.19
− 1.20	$Na_2SO_4.10H_2O$ + Ice		10.23		
− 1.07	$(NH_4)_2B_4O_7.4H_2O$ + Ice			7.08	
− 0.45	$Na_2B_4O_7.10H_2O$ + Ice				1.96
+25.65	$(NH_4)_2SO_4.Na_2SO_4.4H_2O + Na_2SO_4.10H_2O + Na_2SO_4 + Na_2B_4O_7.10H_2O$	62.13	108.76		6.9
26.50	$Na_2SO_4.10H_2O + Na_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$	57.20	114.6		
31.9	$Na_2SO_4.10H_2O + Na_2SO_4 + Na_2B_4O_7.10H_2O$		124.06		3.78
38.70	$(NH_4)_2SO_4.Na_2SO_4.4H_2O + Na_2SO_4 + Na_2B_4O_7.10H_2O + (NH_4)_2B_4O_7.4H_2O$	118.45	63.73		
41.70	$Na_2SO_4 + (NH_4)_2B_4O_7.4H_2O + Na_2B_4O_7.10H_2O + Na_2B_4O_7.5H_2O$	111.78	69.95		48.43
49.30	$Na_2B_4O_7.10H_2O + Na_2B_4O_7.5H_2O + Na_2SO_4$		112.09		12.40
50.55	$Na_2B_4O_7.10H_2O + Na_2B_4O_7.5H_2O + (NH_4)_2B_4O_7.4H_2O$			60.89	37.69
55.70	$(NH_4)_2SO_4.Na_2SO_4.4H_2O + (NH_4)_2SO_4 + Na_2SO_4 + (NH_4)_2B_4O_7.4H_2O$	168.28	101.28	62.89	
59.3	$(NH_4)_2SO_4 + Na_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$	212.0	87.0		

† 0.5A = 0.5$(NH_4)_2SO_4$, 0.5B = 0.5Na_2SO_4, 0.5C = 0.5$(NH_4)_2B_4O_7$, 0.5D = 0.5$Na_2B_4O_7$.

SO_4^{--} NH_4^+ La^{+++}

$H_2O + (NH_4)_2SO_4 + La_2(SO_4)_3$

t = 18°C (22)

g per 100g H_2O

$(NH_4)_2SO_4$	$La_2(SO_4)_3$
$La_2(SO_4)_3.?H_2O$	
0.0	2.130
4.011	0.393
8.727	0.279
18.241	0.253
36.112	0.277
53.823	0.067
73.782	0.0033

SO_4^{--} NH_4^+ Ce^{+++}

$H_2O + (NH_4)_2SO_4 + Ce_2(SO_4)_3$

t = 16°C (22)

g per 100g H_2O

$(NH_4)_2SO_4$	$Ce_2(SO_4)_3$
$Ce_2(SO_4)_3.?H_2O$	
0.0	10.747
3.464	1.026
9.323	0.782
19.240	0.748
29.552	0.701
45.616	0.497
55.083	0.194
63.920	0.090
72.838	0.035

At 25°C, (401.1) shows that solid phases are $Ce_2(SO_4)_3.(NH_4)_2SO_4.8H_2O$ and $Ce_2(SO_4)_3.5(NH_4)_2SO_4$.

SO_4^{--} NH_4^+ Sa^{+++}

$H_2O + (NH_4)_2SO_4 + Sa_2(SO_4)_3$

t = 25°C (229)

g per 100g H_2O

$(NH_4)_2SO_4$	$Sa_2(SO_4)_3$
$Sa_2(SO_4)_3.?H_2O$	
0.3	2.10
0.8	2.00
$Sa_2(SO_4)_3 + (NH_4)_2SO_4.Sa_2(SO_4)_3.7H_2O$	
1.1	2.80

SO_4^{--} NH_4^+ Sa^{+++}.—*(Cont'd)*

g per 100g H_2O

$(NH_4)_2SO_4$	$Sa_2(SO_4)_3$
$(NH_4)_2SO_4.Sa_2(SO_4)_3.7H_2O$	
1.9	1.5
2.7	1.2
7.4	0.8
12.2	0.8
32.5	0.9
46.3	1.0
$(NH_4)_2SO_4.Sa_2(SO_4)_3.7H_2O + (NH_4)_2SO_4$	
77.5	1.3
$(NH_4)_2SO_4$	
76.8	0.6
77.3	0.3

SO_4^{--} NH_4^+ Mg^{++} K^+: $H_2O + (NH_4)_2SO_4 + MgSO_4 + K_2SO_4$; t = 30°C (393); *v.* Fig. 96

	Solid phases	Liquid phase—g per 100g of dissolved salts $(NH_4)_2SO_4$	$MgSO_4$	K_2SO_4	H_2O
A*	$(NH_4)_2SO_4 + (NH_4)_2SO_4.MgSO_4.6H_2O$				
B	Solid soln. [$(NH_4)_2SO_4$ and K_2SO_4]+Solid soln. {$(NH_4)_2SO_4.MgSO_4.6H_2O$, $K_2SO_4.MgSO_4.6H_2O$}	69.88	4.15	25.95	229.4
C		58.59	9.08	32.34	282.0
D		41.52	17.86	40.61	323.2
E		19.31	33.09	47.60	328.8
F	$K_2SO_4 + K_2SO_4.MgSO_4.6H_2O$	0	49.50	50.50	281
G	$K_2SO_4.MgSO_4.6H_2O + MgSO_4.7H_2O$	0	70.60	29.40	
H*	$(NH_4)_2SO_4 + (NH_4)_2SO_4.MgSO_4.6H_2O$				
I	Solid soln. $(NH_4, K)_2SO_4$	9.91	40.62	49.96	350.0
J		16.40	26.65	56.96	317.1
K	Solid soln. $(NH_4, K)_2SO_4.MgSO_4.6H_2O$	35.67	26.68	37.64	343.9
L		37.27	21.72	41.01	338.3
M		83.51	7.21	9.28	290.9
N		9.56	47.39	43.08	331.6
O		24.41	56.02	19.58	352.0

* Not realized experimentally; position on diagram indicated roughly.

SO_4^{--} NH_4^+ Ca^{++} (28, 80, 373) : $H_2O + (NH_4)_2SO_4 + CaSO_4$; *v.* Fig. 97

Solid phases	Liquid phase, t = 22.5°C*, % $(NH_4)_2SO_4$	t = 22.5°C*, % $CaSO_4$	t = 25°C†, % $(NH)_2SO_4$	t = 25°C†, % $CaSO_4$	t = 50°C‡, % $(NH_4)_2SO_4$	t = 50°C‡, % $CaSO_4$
				0.2085		
			0.0129	0.2045	1.561	0.160
			0.0258	0.1997	3.033	0.173
$CaSO_4.2H_2O$			0.1033	0.1808	8.774	0.244
			0.2066	0.1658	14.83	0.314
			0.4130	0.1539	19.95	0.366
			0.8237	0.1435	24.64	0.412
			1.6398	0.1443	29.33	0.436
$CaSO_4.2H_2O + CaSO_4.(NH_4)_2SO_4.2H_2O$?	3.714	0.162	3.2460	0.1589	34.75	0.447
	7.672	0.213	9.4070	0.2211	39.34	0.289
	11.450	0.254	17.966	0.3019	42.68	1.730
	15.08	0.281	33.271	0.3777	45.17	1.584
$CaSO_4.(NH_4)_2SO_4.2H_2O$	18.63	0.318				
	22.10	0.332				
	25.24	0.357				
	28.74	0.370				
$(NH_4)_2SO_4$					45.30	0

Solid phases	Liquid phase—M per 1000M H_2O (94), t = 0°C, $(NH_4)_2$-SO_4	t = 0°C, $CaSO_4$	t = 25°C, $(NH_4)_2$-SO_4	t = 25°C, $CaSO_4$	t = 50°C, $(NH_4)_2$-SO_4	t = 50°C, $CaSO_4$	t = 60°C, $(NH_4)_2$-SO_4	t = 60°C, $CaSO_4$
$CaSO_4.2H_2O + CaSO_4.(NH_4)_2SO_4.H_2O$§	58.7		72.2	0.44				
$CaSO_4.(NH_4)_2SO_4.H_2O + 5CaSO_4.(NH_4)_2SO_4.H_2O$			72.7	0.4				
$CaSO_4.2H_2O + CaSO_4.(NH_4)_2SO_4.H_2O$					74.0	0.93		
$CaSO_4.(NH_4)_2SO_4.H_2O + 5CaSO_4.(NH_4)_2SO_4.H_2O$							76.10	1.12

Solid phases	t = 83°C, $(NH_4)_2$-SO_4	t = 83°C, $CaSO_4$	Invariant points
$CaSO_4.2H_2O + 5CaSO_4.(NH_4)_2SO_4.H_2O$	37.5	0.45	$CaSO_4.2H_2O + CaSO_4.(NH_4)_2SO_4.H_2O + 5CaSO_4.(NH_4)_2SO_4.H_2O$ at 17°C.
$5CaSO_4.(NH_4)_2SO_4.H_2O + 2CaSO_4.(NH_4)_2SO_4$	63.3	0.53	$CaSO_4.(NH_4)_2SO_4.H_2O + 5CaSO_4.(NH_4)_2SO_4.H_2O + 2CaSO_4.(NH_4)_2SO_4$ at 76°C.
$2CaSO_4.(NH_4)_2SO_4 + CaSO_4.(NH_4)_2SO_4.H_2O$	125.8	0.66	

* Data from Cohn (80) recalculated. Used gypsum but did not examine solid phases after saturation, hence those specified in doubt.

† Data from Sullivan (373). Used gypsum but did not examine solid phases after saturation, hence those specified in doubt.

‡ Data from Bell and Taber (28). Used gypsum.

§ Bell and Taber (28, 29) found this salt to be $CaSO_4.(NH_4)_2SO_4.2H_2O$, not as given by D'Ans (94).

SO_4^{--} NH_4^+ Li^+ (337)

$H_2O + (NH_4)_2SO_4 + Li_2SO_4$; *v.* Fig. 98

	Solid phases	Liquid phase, t = 30°C, % $(NH_4)_2$-SO_4	t = 30°C, % Li_2-SO_4	t = 50°C, % $(NH_4)_2$-SO_4	t = 50°C, % Li_2-SO_4
A			25.10		24.30
	$Li_2SO_4.H_2O$	6.66	23.67	7.56	22.86
		9.42	23.02	9.63	22.79
B	$Li_2SO_4.H_2O + NH_4LiSO_4$	12.43*	21.86*	13.94*	21.22*
		19.29	16.58	19.65	16.35
C	NH_4LiSO_4	28.75	10.78		
		35.56	7.84		
D	$NH_4LiSO_4 + (NH_4)_2SO_4$	39.47*	6.51*	43.05	5.86
	$(NH_4)_2SO_4$	40.95	2.93		
E		44.10	0	45.70	

* Average of two or more results.

SO_4^{--} NH_4^+ Na^+; *v.* p. 333

SO_4^{--} NH_4^+ K^+ (393)

$H_2O + (NH_4)_2SO_4 + K_2SO_4$; *v.* Fig. 100

Solid phase, % $(NH_4)_2SO_4$	Solid phase, % K_2SO_4	Liquid phase, % $(NH_4)_2SO_4$	Liquid phase, % K_2SO_4
t = 25°C			
100	0	56.48	0.0
86	12	40.92	1.83
72	28	38.64	3.09
60	40	37.00	4.00
47	53	35.12	4.40
31	69	31.37	5.42
16	84	22.28	7.35
6	94	10.76	9.52
0	100	0.0	10.71
t = 30°C			
100	0	44.20	0.0
96.7	3.3	42.70	1.2
87.8	12.2	40.90	2.4
71.3	28.7	37.80	4.10
56.4	43.6	33.50	5.90
38.7	61.3	31.00	6.40
25.8	74.2	18.50	9.10
1.8	98.2	8.4	10.70
0.0	100.00	0.0	11.12

SO_4^{--} NH_4^+ Na^+ (101, 124, 142, 279, 311)

$H_2O + (NH_4)_2SO_4 + Na_2SO_4$; *v.* Fig. 99

Solid phases	Liquid phase					
	$t = -13°C$		$t = -10°C$		$t = 0°C$	
	% $(NH_4)_2SO_4$	% Na_2SO_4	% $(NH_4)_2SO_4$	% Na_2SO_4	% $(NH_4)_2SO_4$	% Na_2SO_4
$(NH_4)_2SO_4 + Na_2SO_4.(NH_4)_2SO_4.4H_2O$......	38.04	3.35	38.15	3.68	38.22	4.47
$(NH_4)_2SO_4.Na_2SO_4.4H_2O + Na_2SO_4.10H_2O$...	35.49	3.95	34.23	4.74	29.37	7.59

Solid phases	$t = 15°C$		$t = 25°C$		$t = 30°C$		$t = 35°C$		$t = 60°C$	
	% A*	% B*	% A*	% B*	% A*	% B*	% A*	% B*	% A*	% B*
$(NH_4)_2SO_4$	42.36		43.40		43.79		44.67		46.80	
	41.19	2.23	39.16	6.65	41.30	4.09	42.17	3.77	40.30	10.70
	39.73	4.35			39.87	6.00	40.37	7.23		
$(NH_4)_2SO_4 + Na_2SO_4$									36.91	16.33
$(NH_4)_2SO_4 + Na_2SO_4.(NH_4)_2SO_4.4H_2O$	38.19	7.03	38.70	7.95	38.45	8.46	37.84	10.41		
$Na_2SO_4.(NH_4)_2SO_4.4H_2O$	36.30	7.85	27.42	14.12	37.20	9.08	31.21	13.14		
	31.96	9.62	15.80	23.90	34.58	10.27	27.61	15.43		
	29.24	11.06			31.77	11.57	25.84	16.59		
	25.26	13.16			28.77	13.46	24.54	17.62		
	23.10	14.30			25.34	15.85	20.45	21.24		
					22.07	18.34	18.76	22.87		
					18.60	21.49				
					14.93	25.59				
$Na_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$					14.49	25.98	17.18	24.53		
Na_2SO_4					13.45	26.57	11.90	27.41		
					9.89	28.33	4.47	30.83		
					7.85	29.49		33.12	29.48	18.70
									9.70	26.94
										31.20
$Na_2SO_4 + Na_2SO_4.10H_2O$					6.35	30.64				
$Na_2SO_4.10H_2O + Na_2SO_4.(NH_4)_2SO_4.4H_2O$	20.61	16.53	14.10	25.76						
$Na_2SO_4.10H_2O$	20.12	14.96	12.50	24.50	3.61	29.91				
	9.21	13.87	7.40	21.78		29.11				
		11.71		21.71						

Solid phases	$t = 40°C$		$t = 50°C$		$t = 55°C$		$t = 75°C$		$t = 100°C$	
	% A	% B	% A	% B	% A	% B	% A	% B	% A	% B
$(NH_4)_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$	38.50	10.11	37.69	12.77						
$Na_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$	19.80	23.11	26.90	19.82	31.31	18.18				
	$t = 80°C$									
$(NH_4)_2SO_4 + Na_2SO_4$	38.90	16.00					38.24	16.38	40.79	16.27

* A = $(NH_4)_2SO_4$; B = Na_2SO_4.

Invariant points

Solid phases	Liquid phase		
	°C	% $(NH_4)_2SO_4$	% Na_2SO_4
$Na_2SO_4.10H_2O + (NH_4)_2SO_4$ + Ice	−19.5	63.5	5.29
$Na_2SO_4.10H_2O + (NH_4)_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$	−16	63.6	5.32
$Na_2SO_4.10H_2O + Na_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$	+26.5	12.64	27.20
$Na_2SO_4 + (NH_4)_2SO_4 + (NH_4)_2SO_4.Na_2SO_4.4H_2O$	59.3	36.65	16.18

Data for 15 and 35°C from (124), recalculated from g per l; for 30°C from (279); for 25 and 60°C from (142); for remaining temperatures from (101), recalculated from g per 100g H_2O. Fedotiev and Kolossov (124) assign to the double salt the formula $Na(NH_4)SO_4.3H_2O$.

SO_4^{--} PO_4^{---} Ca^{++}: $H_2O + H_2SO_4 + Ca_3(PO_4)_2$

$t = 25°C$ (374)

% H_3PO_4	% $CaSO_4$	% H_3PO_4	% $CaSO_4$
$CaSO_4.2H_2O$*			
0.0	0.2126	18.103	0.7166
0.689	0.3132	24.695	0.7321
1.439	0.3708	35.263	0.6523
2.908	0.4386	44.395	0.5567
6.175	0.5565	50.790	0.4145
13.517	0.6807		

* In these determinations gypsum was added to a mixture of H_2O and H_3PO_4. The resulting solutions contained equivalent amounts of CaO and SO_4, indicating that no calcium phosphate had separated. The author does not note any change in the hydration of the calcium sulfate.

SO_4^{--} PO_4^{---} Ca^{++} K^+

$H_2O + H_2SO_4 + Ca_3(PO_4)_2 + K_2SO_4$; $t = 25°C$ (94)

M per 1000M H_2O

H_3PO_4	K_2SO_4	*	$CaSO_4$
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$			
6.60		4.33	
14.00		5.26	
44.60	6.65		0.222
109.20		9.77	

* $K_2SO_4 + CaSO_4$ (separate determination not made).

SO_4^{--} CO_3^{--} Mg^{++} Na^+; SO_4^{--} CO_3^{--} Ca^{++} Na^+; SO_4^{--} CO_3^{--} Ca^{++} K^+;

v. p. 334

SO_4^{--} CO_3^{--} Sr^{++} Na^+

$H_2O + SrSO_4 + Na_2CO_3$

$t = 25°C$ (177)

$M_{Na_2CO_3}/l$	$M_{Na_2SO_4}/l$
$SrSO_4 + SrCO_3$	
0.0765	1.1285
0.038	0.5645
0.0191	0.0221

SO_4^{--} CO_3^{--} Mg^{++} Na^+ (69)

$H_2O + MgCO_3 + Na_2SO_4$

$t = 24°C$

g Na_2SO_4/l	g $MgCO_3$/l
$MgCO_3$(?)	
0.0	0.216
25.12	0.586
54.76	0.828
95.68	1.020
160.80	1.230
191.90	1.280
254.60	1.338
278.50	1.338
305.10	1.338

$t = 35.5°C$

g Na_2SO_4/l	g $MgCO_3$/l
$MgCO_3$(?)	
0.32	0.131
41.84	0.577
81.84	0.753
116.56	0.904
148.56	0.962
186.70	1.047
224.0	1.088
247.00	1.100
299.0	1.130

SO_4^{--} CO_3^{--} Ca^{++} Na^+

$H_2O + CaCO_3 + Na_2SO_4$

$t = 25°C$ (59)

% Na_2SO_4	% $CaCO_3$
$CaCO_3$	
0.960	0.0149
1.623	0.0177
4.670	0.0249
11.258	0.0277
12.705	0.0281
16.229	0.0289
17.364	0.0283
19.284	0.0290

SO_4^{--} CO_3^{--} Ca^{++} K^+

$H_2O + CaCO_3 + K_2SO_4$

$t = 25°C$ (64)

% K_2SO_4	% $CaCO_3$
$CaCO_3$	
1.60	0.0104
$CaSO_4.K_2SO_4.H_2O$	
3.15	0.0116
4.73	0.0132
6.06	0.0148
7.85	0.0168
8.88	0.0192
10.18	0.0192
10.48	0.0188

SO_4^{--} CO_3^{--} Ba^{++} K^+ (268)

$H_2O + BaCO_3 + K_2SO_4$; *v.* Fig. 101

	Solid phases	Liquid phase—M per 100M H_2O, $t = 25°C$: $0.5K_2CO_3$	$0.5K_2SO_4$
A	$K_2CO_3.2H_2O + BaCO_3$	295.8	
B	$K_2CO_3.2H_2O + BaCO_3 + K_2SO_4$	295.60	0.102
C	$K_2SO_4 + BaCO_3$	105.20	2.60
D		75.60	4.66
E	$BaCO_3 + K_2SO_4 + BaSO_4$	58.20	6.44
F	$K_2SO_4 + BaSO_4$	39.40	9.70
G		17.44	15.60
H		0	24.94
I	$BaCO_3 + BaSO_4$	20.80	1.352
J		7.66	0.368
	$t = 80°C$		
	$BaCO_3 + K_2SO_4 + BaSO_4$	51.40	18.92
	$BaCO_3 + BaSO_4$	13.58	3.06
		6.70	1.308
	$t = 100°C$		
	$BaCO_3 + K_2SO_4 + BaSO_4$	46.0	25.30
	$BaCO_3 + BaSO_4$	12.56	4.04
		6.34	1.702

SO_4^{--} CO_3^{--} Na^+ (72)

$H_2O + Na_2SO_4 + Na_2CO_3$; *v.* Fig. 102

°C	Solid phases	Liquid phase: % Na_2CO_3	% Na_2SO_4
15	$Na_2SO_4.10H_2O$		11.8
	Solid soln. I* + Solid soln. II†	12.3	8.0
	$Na_2CO_3.10H_2O$	14.1	
20	$Na_2SO_4.10H_2O$		16.25
	Solid soln. I* + Solid soln. II†	14.95	1.2
	$Na_2CO_3.10H_2O$	17.75	

SO_4^{--} CO_3^{--} Na^+.—(*Continued*)

°C	Solid phases	Liquid phase: % Na_2CO_3	% Na_2SO_4
25	$Na_2SO_4.10H_2O$	0	21.9
	Solid soln. I* + Solid soln. II†	17.9	16.2
	$Na_2CO_3.10H_2O$	22.6	
30	$Na_2SO_4.10H_2O$		29.3
	$Na_2SO_4.10H_2O + Na_2SO_4$	10.2	25.1
	$Na_2SO_4 + 2Na_2SO_4.Na_2CO_3$	15.5	19.5
	$2Na_2SO_4.Na_2CO_3 + Na_2CO_3.10H_2O$	25.8	8.6
	$Na_2CO_3.10H_2O$	27.15	0
35	Na_2SO_4	0	33.15
	$Na_2SO_4 + 2Na_2SO_4.Na_2CO_3$	14.3	20.6
	$2Na_2SO_4.Na_2CO_3 + Na_2CO_3.7H_2O$	30.0	5.7
	$Na_2CO_3.7H_2O$	33.0	0
50	Na_2SO_4	0	31.8
	$Na_2SO_4 + 2Na_2SO_4.Na_2CO_3$	29.7	5.5
	$Na_2CO_3.H_2O$	32.2	
75	Na_2SO_4		30.4
	$Na_2SO_4 + 2Na_2SO_4.Na_2CO_3$	7.6	24.2
	$2Na_2SO_4.Na_2CO_3 + Na_2CO_3.H_2O$	29.0	4.8
	$Na_2CO_3.H_2O$	31.45	

* Solid soln. I = $Na_2SO_4.10H_2O$ with from 0 to 7.3 M % $Na_2CO_3.10H_2O$.

† Solid soln. II = $Na_2SO_4.10H_2O$ with from 95 to 100 M % $Na_2CO_3.10H_2O$.

Invariant points; *v.* Fig. 102

°C		Solid phases	% Na_2CO_3	% Na_2SO_4
− 1.2	A	$Na_2SO_4.10H_2O$ + Ice		3.85
− 2.1	G	$Na_2CO_3.10H_2O$ + Ice	5.75	
− 2.45	P	$Na_2CO_3.10H_2O + Na_2SO_4.10H_2O$ + Ice	5.21	2.06
+26.1	Q	$Na_2CO_3.10H_2O + Na_2SO_4.10H_2O + 2Na_2SO_4.Na_2CO_3$	19.0	17.6
27.3	R	$Na_2SO_4.10H_2O + Na_2SO_4 + 2Na_2SO_4.Na_2CO_3$	16.3	19.3
30.5	S	$Na_2CO_3.10H_2O + Na_2CO_3.7H_2O + 2Na_2SO_4.Na_2CO_3$	26.2	8.3
35.7	T	$Na_2CO_3.7H_2O + Na_2CO_3.H_2O + 2Na_2SO_4.Na_2CO_3$	30.1	5.65
32.0	F	$Na_2CO_3.10H_2O + Na_2CO_3.7H_2O$		31.34
35.37	E	$Na_2CO_3.7H_2O + Na_2CO_3.H_2O$		33.18

Boiling points of saturated solutions

°C		Solid phases	% Na_2CO_3	% Na_2SO_4
102.9	C	Na_2SO_4		29.6
104.6	D	$Na_2CO_3.H_2O$	31.2	
103.0	U	$Na_2SO_4 + 2Na_2SO_4.Na_2CO_3$	4.7	25.2
104.8	V	$Na_2CO_3.H_2O + 2Na_2SO_4.Na_2CO_3$	28.1	4.5

$t = 19.1°C$ (100)

% Na_2CO_3	% Na_2SO_4
Solid soln. A* ($Na_2CO_3.10H_2O + Na_2SO_4.10H_2O$)	
15.97	4.97
14.92	9.05
14.82	9.50
Solid soln. B† ($Na_2SO_4.10H_2O + Na_2CO_3.10H_2O$)	
14.53	10.47
13.84	10.69
12.13	11.06
9.22	11.89
4.85	13.17
$t = 50°C$ (100)	
Solid soln. A	
28.66	5.35
28.52	5.87

$t = 50°C$ (100)

% Na_2CO_3	% Na_2SO_4
Solid soln. B	
25.71	7.52
19.37	12.92
12.55	20.38
10.52	22.47
Solid soln. C	
10.21	23.10
5.06	27.31
$t = 25°C$ (37)	
$Na_2CO_3.10H_2O$	
22.94	
$Na_2CO_3.10H_2O + Na_2SO_4.10H_2O$	
18.11	15.89
$Na_2SO_4.10H_2O$	
0.0	21.84

* From 0 to 1.9 Wt. % Na_2SO_4.

† From 0 to 2 Wt. % Na_2CO_3.

SO_4^{--} CO_3^{--} Na^+ K^+

$H_2O + Na_2SO_4 + K_2CO_3$; *v.* Fig. 103

$t = 25°C$ (37)

	Solid phases	Liquid phase—M per 1000M H_2O			
		$0.5Na_2CO_3$	$0.5K_2CO_3$	$0.5Na_2SO_4$	$0.5K_2SO_4$
A	$Na_2CO_3.10H_2O$	101.26			
B	$Na_2CO_3.10H_2O + Na_2SO_4.10H_2O$	93.20		61.0	
C	$Na_2SO_4.10H_2O$			70.82	
D	$Na_2SO_4.10H_2O + K_3Na(SO_4)_2$			78.54	18.72
E	$K_3Na(SO_4)_2 + K_2SO_4$			17.40	27.44
F	K_2SO_4				24.92
G	$K_2CO_3.\frac{3}{2}H_2O$		295.86		
H	$K_2CO_3.\frac{3}{2}H_2O + NaKCO_3.6H_2O$	37.00	171.4		
I	$NaKCO_3.6H_2O + Na_2CO_3.7H_2O$	120.80	79.40		
J	$Na_2CO_3.7H_2O + Na_2CO_3.10H_2O$	121.00	49.40		
P	$K_2CO_3.\frac{3}{2}H_2O + NaKCO_3.6H_2O + K_2SO_4$	36.80	270.20		2.80
Q	$NaKCO_3.6H_2O + Na_2CO_3.7H_2O + K_2SO_4$	120.08	70.52	2.56	
R	$Na_2CO_3.7H_2O + Na_2CO_3.10H_2O + K_2SO_4$	121.00	48.20		3.00
S	$Na_2CO_3.10H_2O + K_2SO_4 + K_3Na(SO_4)_2$	114.60	19.20		13.0
T	$K_3Na(SO_4)_2 + Na_2CO_3.10H_2O + Na_2SO_4.10H_2O$	88.60	7.38	64.56	

SO_4^{--} $C_2O_4^{--}$ Th^{++++}

$H_2O + H_2SO_4 + Th(C_2O_4)_2$

$t = 25°C$ (395)

M $\frac{1}{2}H_2SO_4$/l	% $Th(C_2O_4)_2$
$Th(C_2O_4)_2.6H_2O$	
1	0.0398
2	0.0602
2.9	0.0695
4.32	0.170
6.175	0.2337
6.685	0.2771
8.45	0.382
$t = 25°C$ (168)	
$Th(C_2O_4)_2.6H_2O$	
0.25	0.0108
0.50	0.0216
1.0	0.0412
2.1	0.0646
3.2	0.1097
4.9	0.2034

SO_4^{--} $C_2O_4^{--}$ Sc^{+++}

$H_2O + H_2SO_4 + Sc_2(C_2O_4)_3$

$t = ?$ (398)

M $\frac{1}{2}H_2SO_4$/l	% $Sc_2(C_2O_4)_3$
$Sc_2(C_2O_4)_3.5H_2O$	
1	0.1148
2.1	0.2573
2.43	0.2904
3.57	0.4202
4.32	0.5192
4.86	0.5834

M $\frac{1}{2}$ H_2SO_4/l	% $Sc_2(C_2O_4)_3$ $t = 25°C$	% $Sc_2(C_2O_4)_3$ $t = 50°C$
$Sc_2(C_2O_4)_3.5H_2O$ (265)		
0.1	0.0385	0.0562
0.5	0.0997	0.1481
1.0	0.1663	0.2493
2.0	0.3176	0.4429
3.0	0.7761	1.1280

SO_4^{--} $C_2O_4^{--}$ Y^{+++}

$H_2O + H_2SO_4 + Y_2(C_2O_4)_3$

$t = 25°C$ (395)

M $\frac{1}{2}H_2SO_4$/l	% $Y_2(C_2O_4)_3$
$Y_2(C_2O_4)_3.9H_2O$	
2.16	0.6884
4.32	1.40

SO_4^{--} $C_2O_4^{--}$ La^{+++}

$H_2O + H_2SO_4 + La_2(C_2O_4)_3$

$t = 25°C$ (394)

% C_2O_4	% SO_3	% La_2O_3
$La_2(C_2O_4)_3.7H_2O$		
0.32	7.21	0.47
0.373	8.81	0.548
0.497	10.79	0.73
0.545	14.52	0.823
$La_2(C_2O_4)_3.7H_2O + (COOH)_2.2H_2O$		
6.004	5.14	0.002
3.202	14.30	0.077
2.370	19.07	0.298
$La_2(SO_4)_3.9H_2O + (COOH)_2.2H_2O$		
2.20	20.0	0.345
2.14	21.89	0.27
1.85	25.23	0.24
$La_2(C_2O_4)_3.7H_2O + La_2(SO_4)_3.9H_2O$		
0.84	16.43	0.749
0.90	16.50	0.73
1.44	17.98	0.58
$La_2(C_2O_4)_3.7H_2O + La_2(SO_4)_3.9H_2O + (COOH)_2.2H_2O$		
2.23	19.82	0.36

$t = 25°C$ (395)

M $\frac{1}{2}H_2SO_4$/l	% $La_2(C_2O_4)_3$
$La_2(C_2O_4)_3.7H_2O$	
1.0	0.3962
1.5	0.5304
2.0	0.7344
3.09	1.1306
4.32	1.463
5.30	1.746
5.60	1.8155

SO_4^{--} $C_2O_4^{--}$ Ce^{+++}

$H_2O + H_2SO_4 + Ce_2(C_2O_4)_3$

$t = 25°C$ (395)

M $\frac{1}{2}H_2SO_4$/l	% $Ce_2(C_2O_4)_3$
$Ce_2(C_2O_4)_3.9H_2O$	
1	0.1802
1.445	0.2788
2.900	0.7467
3.90	0.9957
4.32	1.186
5.30	1.425

SO_4^{--} $C_2O_4^{--}$ Sm^{+++}

$H_2O + H_2SO_4 + Sm_2(C_2O_4)_3$

$t = 25°C$ (395)

M $\frac{1}{2}H_2SO_4$/l	% $Sm_2(C_2O_4)_3$
$Sm_2(C_2O_4)_3.10H_2O$	
1	0.1015
1.445	0.1804
1.93	0.2254
2.80	0.3886
4.32	0.7008
6.175	1.072

SO_4^{--} $C_2O_4^{--}$ Gd^{+++}

$H_2O + H_2SO_4 + Gd_2(C_2O_4)_3$

$t = 25°C$ (395)

M $\frac{1}{2}H_2SO_4$/l	% $Gd_2(C_2O_4)_3$
$Gd_2(C_2O_4)_3.10H_2O$	
2.16	0.3005
3.11	0.4803
4.32	0.6956
6.175	1.128

SO_4^{--} $C_2O_4^{--}$ Er^{+++}

$H_2O + H_2SO_4 + Er_2(C_2O_4)_3$

$t = 25°C$ (395)

M $\frac{1}{2}H_2SO_4$/l	% $Er_2(C_2O_4)_3$
$Er_2(C_2O_4)_3.14H_2O$	
2.16	0.5144
3.11	0.7708
4.32	1.10
6.175	1.72

SO_4^{--} $C_2O_4^{--}$ Na^+ (82)

$H_2O + Na_2SO_4 + Na_2C_2O_4$

°C	% Na_2SO_4	% $Na_2C_2O_4$
$Na_2SO_4.10H_2O + Na_2C_2O_4$		
15	10.26	0.86
$Na_2SO_4 + Na_2C_2O_4$		
50	31.95	0.22

SO_4^{--} $C_2O_4^{--}$ K^+ (82)

$H_2O + K_2SO_4 + K_2C_2O_4$

°C	% K_2SO_4	% $K_2C_2O_4$
$K_2SO_4 + K_2C_2O_4.H_2O$		
15	1.82	23.55
50	1.99	31.06

SO_4^{--} HCO_3^- Na^+

$H_2O + Na_2SO_4 + NaHCO_3$

$t = 15°C$ (279)

% $NaHCO_3$	% Na_2SO_4
$NaHCO_3$	
7.96	0.0
7.22	1.94
6.74	3.29
6.45	4.30
6.17	5.34
6.03	5.76
5.80	6.54
$NaHCO_3 + Na_2SO_4.10H_2O$	
5.08	9.55
$Na_2SO_4.10H_2O$	
0.0	11.59

$t = 35°C$ (124)

% $NaHCO_3$*	% Na_2SO_4*
$NaHCO_3$	
10.44	0
7.60	6.13
4.61	14.12
3.33	25.61
$NaHCO_3 + Na_2SO_4$	
2.43	30.88

* Under pressure of 3 atmospheres of CO_2.

SO_4^{--} $C_2H_3O_2^-$ Pb^{++} Na^+

$H_2O + PbSO_4 + NaC_2H_3O_2$

t = 25°C (140)

% $NaC_2H_3O_2$	% $Pb(C_2H_3O_2)_2$	% Na_2SO_4
$PbSO_4$		
6.69	0.78	0.34
11.76	2.73	1.26
16.90	5.70	2.49
19.92	8.24	3.60
21.51	10.75	4.68
69.5	0.81	0.35

SO_4^{--} $C_2H_3O_2^-$ Pb^{++} K^+

$H_2O + PbSO_4 + KC_2H_3O_2$

t = 25°C (140)

% $KC_2H_3O_2$	% $Pb(C_2H_3O_2)_2$
$PbSO_4 + K_2Pb(SO_4)_2$	
4.33	2.54
9.03	3.55
17.81	5.43
22.07	5.95
26.58	9.83
28.82	11.40
28.93	19.41

SO_4^{--} $C_2H_3O_2^-$ Ca^{++} Na^+ K^+

$H_2O + Ca(C_2H_3O_2)_2 + Na_2SO_4 + K_2SO_4$

t = 25°C (94)

M per 1000M H_2O

$NaC_2H_3O_2$	K_2SO_4	$CaSO_4$
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$		
12.91	3.513	0.529
30.52	3.587	0.837

SO_4^{--} $C_2H_3O_2^-$ Ca^{++} K^+

$H_2O + H_2SO_4 + Ca(C_2H_3O_2)_2 + K_2SO_4$

t = 25°C (94)

M per 1000M H_2O

$HC_2H_3O_2$	K_2SO_4	$CaSO_4$
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$		
7.57	3.01	0.220
41.66	3.18	0.110
94.82	2.45	0.061

SO_4^{--} $C_2H_3O_2^-$ Ca^{++} K^+

$H_2O + HC_2H_3O_2 + CaSO_4 + KC_2H_3O_2$; t = 25°C (94)

M per 1000M H_2O

K_2SO_4	$CaSO_4$	$HC_2H_3O_2$	$KC_2H_3O_2$
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$			
2.00	0.313	3.582	0.0
0.0	0.751	15.45	1.58

SO_4^{--} $C_2H_3O_2^-$ Na^+

$H_2O + Na_2SO_4 + NaC_2H_3O_2$

t = 25°C (140)

% $NaC_2H_3O_2$	% Na_2SO_4
$Na_2SO_4.10H_2O$	
0	21.90
4.10	17.72
7.71	16.48

SO_4^{--} $C_2H_3O_2^-$ Na^+.—(*Cont'd*)

% $NaC_2H_3O_2$	% Na_2SO_4
$Na_2SO_4.10H_2O$	
12.58	13.50
16.26	11.50
20.63	8.10

SO_4^{--} $C_2H_3O_2^-$ K^+

$H_2O + K_2SO_4 + KC_2H_3O_2$

t = 25°C (140)

% $KC_2H_3O_2$	% K_2SO_4
K_2SO_4	
6.11	6.65
8.68	5.09
11.29	3.99
15.59	2.35
20.12	1.23
29.95	0.39

SO_4^{--} $HC_4H_4O_6^-$ K^+

$H_2O + K_2SO_4 + KHC_4H_4O_6$

t = 25°C (283)

M ½K_2SO_4/l	$M_{KHC_4H_4O_6}$/l
$KHC_4H_4O_6$	
0	0.0347
0.05	0.02083
0.10	0.01471
0.20	0.01003

SO_4^{--} $C_8H_4O_4^{--}$ Na^+; SO_4^{--} β-$C_{10}H_7SO_3^-$ Na^+; *v.* p. 337

SO_4^{--} Zr^{++++} (166)

$H_2O + H_2SO_4 + Zr(SO_4)_2$

t = 22°C

% ZrO_2	% SO_3
$Zr(SO_4)_2.4H_2O$	
0.10	56.10
0.13	56.50
0.21	57.20
$Zr(SO_4)_2.H_2SO_4.3H_2O$	
0.80	66.40
0.65	67.50
0.60	68.10
t = 39.5°C	
$Zr(SO_4)_2.4H_2O$	
19.5	25.46
18.8	27.00
17.3	25.30
16.2	29.10
9.6	32.30
5.3	34.7
3.51	36.01
1.03	38.20
0.46	39.80
0.31	42.00
0.14	46.80
0.15	56.70
0.27	57.10
0.60	57.80
2.00	59.50
$Zr(SO_4)_2.H_2SO_4.3H_2O$	
4.55	61.50
3.25	62.50
1.55	65.00
0.96	68.40
$4ZrO_2.3SO_3.14H_2O$	
5.09	7.28
4.66	6.83

SO_4^{--} Zr^{++++}.—(*Continued*)

% ZrO_2	% SO_3
$4ZrO_2.3SO_3.14H_2O$	
3.55	6.03
3.06	5.54
2.34	4.67
1.92	4.17
0.99	2.61
0.80	2.15
0.39	1.13
0.33	1.01
0.20	0.60
0.14	0.42
0.29	0.0

SO_4^{--} Th^{++++} (235)

$H_2O + H_2SO_4 + Th(SO_4)_2$

t = 20°C

% H_2SO_4	% $Th(SO_4)_2$
$Th(SO_4)_2.8H_2O$	
5.00	1.722
15.00	0.9752
25.00	0.3838
40.00	0.0103
t = 30°C	
$Th(SO_4)_2.8H_2O$	
	2.152
0.466	2.055
0.720	2.085
1.468	2.267
2.983	2.311
4.380	2.367
4.970	2.323
9.950	1.961
15.03	1.484
18.95	1.078
23.64	0.7196
32.68	0.3364
$Th(SO_4)_2.4H_2O$	
37.80	0.077
43.28	0.0213
45.69	0.0047
74.00	0.1208
80.50	0.00
t = "boiling soln."	
$Th(SO_4)_2.4H_2O$	
5.00	0.7407
10.00	0.4808
15.00	0.3882

t = 25°C (395)

M ½H_2SO_4/l	% $Th(SO_4)_2$
$Th(SO_4)_2.9H_2O$	
0.0	1.593
1.1	1.831
2.16	1.488
4.32	0.8751
6.68	0.4312
9.68	0.1045
10.89	0.0636
15.15	0.0308

SO_4^{--} Th^{++++} Li^+

$H_2O + Th(SO_4)_2 + Li_2SO_4$

t = 25°C (23)

g per 100g H_2O

Li_2SO_4	$Th(SO_4)_2$
$Th(SO_4)_2.?H_2O$	
0.0	1.722
2.57	4.13

SO_4^{--} Th^{++++} Li^+.—(*Cont'd*)

g per 100g H_2O

Li_2SO_4	$Th(SO_4)_2$
$Th(SO_4)_2.?H_2O$	
4.93	6.20
6.98	7.95
9.23	9.68
11.13	11.05
13.18	12.54
16.12	14.52
20.49	16.92
25.18	18.87

SO_4^{--} Th^{++++} Na^+

$H_2O + Th(SO_4)_2 + Na_2SO_4$

t = 16°C (21)

g per 100g H_2O

Na_2SO_4	$Th(SO_4)_2$
$Th(SO_4)_2.?H_2O$	
1.094	1.743
1.960	2.387
2.84	3.800
4.11	3.375
9.35	1.379
12.24	1.169
15.36	1.048

SO_4^{--} Th^{++++} K^+

$H_2O + Th(SO_4)_2 + K_2SO_4$

t = 16°C (21)

g per 100g H_2O

K_2SO_4	$Th(SO_4)_2$
$Th(SO_4)_2.?H_2O$	
0.0	1.390
0.424	1.667
1.004	2.193
1.224	2.514
1.348	1.706
1.487	0.870
1.844	0.370
3.092	0.070
4.050	0.027
4.825	0.003

SO_4^{--} Tl^+; *v. also* p. 337

t = 25°C (95)

M per 1000g soln.

H_2SO_4	Tl_2SO_4
$Tl_2SO_4 + Tl_3H(SO_4)_2$	
2.99	0.46
$Tl_3H(SO_4)_2 + TlHSO_4$	
4.25	0.61
$TlHSO_4$	
4.55	0.56
4.79	0.55
4.89	0.59
4.92	0.66
4.78	0.75
4.26	1.01
4.03	1.08

t = 25°C (280)

g H_2SO_4/l	g Tl_2SO_4/l
Tl_2SO_4	
0.0	54.67
7.016	59.17
14.02	63.06

SO_4^{--} $C_8H_4O_4^{--}$ Na^+ (139): $H_2O + Na_2SO_4 + Na_2C_8H_4O_4$

Solid phases	Liquid phase					
	t = 0°C		t = 25°C		t = 35°C	
	% Na_2P*	% Na_2SO_4	% Na_2P*	% Na_2SO_4	% Na_2P*	% Na_2SO_4
$2Na_2C_8H_4O_4.7H_2O$	40.56	0.0	43.79	0.0	46.06	0.0
			40.63	3.52		
$2Na_2C_8H_4O_4.7H_2O + Na_2SO_4.10H_2O$	40.19†	0.563†				
$2Na_2C_8H_4O_4.7H_2O + Na_2SO_4$			39.92†	4.57†	43.25†	3.27†
$Na_2SO_4.10H_2O$	25.83	0.63	34.06	6.39		
	0.0	4.48	27.52	7.59		
			21.09	9.67		
			17.47	11.12		
			12.34	13.61		
			10.14	14.78		
			7.39	16.53		
			6.18	17.35		
$Na_2SO_4.10H_2O + Na_2SO_4$			35.41†	6.32†		
Na_2SO_4			37.99	5.48	28.64	9.67
			30.88‡	8.69‡	11.25	22.38
			24.62‡	12.62‡	0.0	33.10
			13.67‡	20.91‡		

* P = the phthalate radical ($C_8H_4O_4$). † Average values. ‡ Supersaturated with respect to $Na_2SO_4.10H_2O$.

SO_4^{--} β-$C_{10}H_7SO_3^-$ Na^+ (85)

$H_2O + Na_2SO_4$ + Sodium β-naphthalenesulfonate

Solid phase in all cases sodium β-naphthalenesulfonate

t = 25°C		t = 30°C		t = 40°C		t = 50°C		t = 65°C	
% β salt	% Na_2SO_4	% β salt	% Na_2SO_4	% β salt	% Na_2SO_4	% β salt	% Na_2SO_4	% β salt	% Na_2SO_4
3.42	1.97	1.97	4.81	4.3	2.85	5.72	2.87	11.75	1.68
2.41	3.06	0.26	13.23	2.18	5.83	3.49	5.35	7.37	5.25
1.79	4.34	0.0	29.1	1.2	8.48	1.93	8.24	6.7	5.45
0.93	7.4			0.77	10.92	1.42	10.01	1.9	12.0
0.62	9.25			0.0	32.5	0.0	31.9	3.14	10.86
0.52	10.52							0.25	26.96
0.10	13.15							0.0	31.00
0.0	21.90								

SO_4^{--} Tl^{+++} (266)

$H_2O + H_2SO_4 + Tl_2O_3$; *v.* Fig. 104 and p. 336

	Solid phases*	Liquid phase	
		% H_2SO_4 in 100 cm^3	g Tl_2O_3 dissolved
A	$Tl(OH)SO_4.2H_2O$	20	16.25
B		40	9.83
C	$TlH(SO_4)_2.4H_2O$	50	2.52
D		70	0.30

* The authors (266) found transformation of one solid to other extremely slow. The acid salt was found to form in preference to the basic salt at lower temperatures and with larger concentrations of H_2SO_4.

SO_4^{--} Tl^+ Ce^{+++}: $H_2O + Tl_2SO_4 + Ce_2(SO_4)_3$; t = 25°C (401.5)

Shows that the solid phases present are $Ce_2(SO_4)_3.Tl_2SO_4.4H_2O$, $Ce_2(SO_4)_3.3Tl_2SO_4.?H_2O$ and $Ce_2(SO_4)_3.4\frac{1}{2}Tl_2SO_4$.

SO_4^{--} Tl^+ Na^+: $H_2O + Tl_2SO_4 + Na_2SO_4$; t = 25°C (280)

g Tl_2SO_4/l	g Na_2SO_4/l	g Tl_2SO_4/l	g Na_2SO_4/l
Tl_2SO_4			
54.67	0.0	59.22	28.24
54.52	7.06		

SO_4^{--} Tl^+ Al^{+++} K^+

$H_2O + Tl_2SO_4 + Al_2(SO_4)_3 + K_2SO_4$

t = 25°C (129)

Solid phase—M %		Liquid phase—M per l	
$Al_2(SO_4)_3.Tl_2SO_4.24H_2O$	$Al_2(SO_4)_3.K_2SO_4.24H_2O$	$Al_2(SO_4)_3.Tl_2SO_4.24H_2O$	$Al_2(SO_4)_3.K_2SO_4.24H_2O$
0.00	100.00	0.00	0.2705
0.68	99.32	0.00113	0.2882
3.16	96.84	0.00407	0.2628
9.16	90.84	0.01067	0.2527
17.06	82.94	0.02267	0.2514
31.76	68.24	0.04356	0.2059
41.77	58.23	0.05810	0.1754
53.28	46.72	0.07675	0.1472
55.67	44.23	0.08410	0.1336
67.93	32.07	0.1016	0.1097
92.06	7.94	0.1562	0.04236
100.00	0.00	0.1783	0.00

SO_4^{--} Zn^{++} Cu^{++} (130, 213, 367)

$H_2O + ZnSO_4 + CuSO_4$; *v.* Fig. 105

Solid phases—Solid soln.*	Solid phase			Liquid phase	
	Composition in M of:				
	$CuSO_4$	$ZnSO_4$	H_2O	$CuSO_4$	$ZnSO_4$
t = 12°C					
I†	0.031	0.969	7	0.102	0.898
II‡	0.174	0.826	7		
II‡	0.386	0.614	7	0.278	0.722
III§	0.883	0.117	5		
t = 18°C					
I	0.020	0.980	7	0.084	0.916
II	0.149	0.851	7		
II	0.319	0.681	7	0.215	0.785
III	0.828	0.172	5		
I	0.022	0.978	7		
II	0.147	0.853	7		
II	0.400	0.600	7		
III	0.850	0.150	5		
t = 25°C					
I	0.025	0.975	7	0.098	0.902
II	0.135	0.865	7		
II	0.285	0.715	7	0.218	0.782
III	0.793	0.207	5		

SO_4^{--} Zn^{++} Cu^{++}.—(*Continued*)

Solid phases—Solid soln.*	Solid phase: $CuSO_4$	Solid phase: $ZnSO_4$	Solid phase: H_2O	Liquid phase: $CuSO_4$	Liquid phase: $ZnSO_4$
			t = 35°C		
I	0.022	0.978	7	0.081	0.919
II	0.123	0.877	7		
II	0.254	0.746	7	0.180	0.820
III	0.687	0.313	5		
			t = 40°C		
IV‡	0.038	0.972	6	0.111	0.889
II	0.148	0.852	7		
II	0.246	0.754	7	0.158	0.842
III	0.587	0.413	5		
			t = 45°C		
IV	0.055	0.945	6	0.147	0.853
III	0.490	0.510	5		

* Solid solutions are I, II, etc., as indicated. † Rhombic. ‡ Monoclinic. § Triclinic.

SO_4^{--} Zn^{++} Mn^{++} (320)

$H_2O + ZnSO_4 + MnSO_4$; *v.* Fig. 106

	Solid phases	Solid phases: $MnSO_4$	Solid phases: $ZnSO_4$	Solid phases: H_2O	Liquid phase: $MnSO_4$	Liquid phase: $ZnSO_4$	Liquid phase: H_2O
				t = 0°C			
	$ZnSO_4.7H_2O$		1	7		1	21.4
	Solid soln. I	0.205	0.795	7	0.430	0.570	17.3
A	Solid soln. I	0.32	0.68	7	0.60	0.40	
B	Solid. soln. II†	0.52	0.48	7			
	Solid. soln. II†	0.837	0.163		0.866	0.134	
	$MnSO_4.7H_2O$	1.00		7	1.00		15.70
				t = 20°C			
	$ZnSO_4.7H_2O$		1.00	7		1.00	16.60
	Solid. soln. I	0.191	0.809	7	0.488	0.512	13.00
C	Solid. soln. I	0.235	0.765	7	0.540	0.460	
D	Solid soln. II	0.410	0.590	7			
E	Solid soln. II	0.665	0.335	7	0.748	0.252	
F	Solid soln. III‡	0.865	0.135	5			
	$MnSO_4.5H_2O$	1.00		5	1.00		13.40

SO_4^{--} Zn^{++} Mn^{++}.—(*Continued*)

	Solid phases	Solid phases: $MnSO_4$	Solid phases: $ZnSO_4$	Solid phases: H_2O	Liquid phase: $MnSO_4$	Liquid phase: $ZnSO_4$	Liquid phase: H_2O
				t = 23°C			
	$ZnSO_4.7H_2O$		1.00	7		1.00	15.90
	Solid soln. II	0.59	0.41	7	0.664	0.336	
G	Solid soln. II	0.61	0.39	7	0.683	0.317	
H	Solid soln. IV*	0.82	0.18	4			
I	Solid soln. IV*	0.91	0.09	4	0.825	0.175	
J	Solid soln. III	0.92	0.08	5			
				t = 26°C			
	$ZnSO_4.7H_2O$		1.00	7			
	Solid soln. I	0.15	0.85	7			
K	Solid soln. I	0.225	0.775	7	0.525	0.475	
L	Solid soln. II	0.380	0.620	7			
	Solid soln. II	0.488	0.512	7	0.603	0.397	11.70
M	Solid soln. II	0.50	0.500	7	0.625	0.375	
N	Solid soln. IV	0.780	0.220	4			
	Solid soln. IV	0.856	0.144	4	0.739	0.261	11.30
				t = 32°C			
	$MnSO_4.4H_2O$	1.00		4	1.00		12.85
	$ZnSO_4.7H_2O$		1.00	7		1.00	14.10
O	Solid soln. I	0.21	0.79	7	0.46	0.54	
P	Solid soln. IV	0.545	0.455	4			
	Solid soln. IV	0.700	0.300	4	0.566	0.434	
	Solid soln. IV	1.00		4	1.00		12.60
				t = 38°C			
	$ZnSO_4.6H_2O$		1.00	6		1.00	12.90
Q	Solid soln. V	0.325	0.675	6	0.415	0.585	
R	Solid soln. IV	0.645	0.360	4			

* Rhombic. † Monoclinic. ‡ Triclinic.

SO_4^{--} Zn^{++} Mg^{++} (212)

$H_2O + ZnSO_4 + MgSO_4$; *v.* Fig. 107

The author (212) determined the vapor pressures of eleven solid solutions containing as determined by analysis from 9 7 to 88.7% $MgSO_4.7H_2O$. He calculated the relative proportions of the two components, in the solutions from whieh these solids separated, from the volumes of saturated solutions of the component salts used in preparing the mixture. The relation between the compositions of the solid and liquid phases was shown by means of a graph (Fig. 107).

SO_4^{--} Zn^{++} Na^{+} (233): $H_2O + ZnSO_4 + Na_2SO_4$

Liquid phase

Solid phases	t = 0°C % Na_2SO_4	t = 0°C % $ZnSO_4$	t = 5°C % Na_2SO_4	t = 5°C % $ZnSO_4$	t = 10°C % Na_2SO_4	t = 10°C % $ZnSO_4$	t = 15°C % Na_2SO_4	t = 15°C % $ZnSO_4$	t = 20°C % Na_2SO_4	t = 20°C % $ZnSO_4$	t = 25°C % Na_2SO_4	t = 25°C % $ZnSO_4$	t = 30°C % Na_2SO_4	t = 30°C % $ZnSO_4$	t = 35°C % Na_2SO_4	t = 35°C % $ZnSO_4$
$Na_2SO_4.10H_2O + ZnSO_4.7H_2O$	5.34	27.20	6.27	27.85												
$ZnSO_4.7H_2O$ + $Na_2SO_4.ZnSO_4.4H_2O$					7.16	29.16	6.40	30.70	5.36	32.51	4.42	34.26	3.80	36.28	3.30	38.19
$Na_2SO_4.ZnSO_4.4H_2O$											15.63	17.58	15.64	17.66	15.70	17.59
$Na_2SO_4.ZnSO_4.4H_2O + Na_2SO_4.10H_2O$					7.92	27.91	10.90	24.08	14.58	19.12	19.94	13.31	27.76	6.96		

Solid phases	t = 38°C % Na_2SO_4	t = 38°C % $ZnSO_4$	t = 40°C % Na_2SO_4	t = 40°C % $ZnSO_4$
$ZnSO_4.6H_2O$ + $Na_2SO_4.ZnSO_4.4H_2O$	2.90	38.83	2.78	38.26
$Na_2SO_4.ZnSO_4.4H_2O$			15.72	17.75
$Na_2SO_4.ZnSO_4.4H_2O + Na_2SO_4$	30.02*	5.62*	28.65	5.95

* t = 35°C.

Transition temperatures

°C	Solid phases	% Na_2SO_4	% $ZnSO_4$
−8.3	$Na_2SO_4.10H_2O + ZnSO_4.7H_2O$ + Ice		
−6.5	$ZnSO_4.7H_2O$ + Ice		
+8.7	$Na_2SO_4.10H_2O + Na_2SO_4.ZnSO_4.4H_2O + ZnSO_4.7H_2O$	7.43	28.45
31.5	$Na_2SO_4.10H_2O + Na_2SO_4.ZnSO_4.4H_2O + Na_2SO_4$		
39	$ZnSO_4.7H_2O + ZnSO_4.6H_2O$		

SO_4^{--} Zn^{++} K^+

$H_2O + ZnSO_4 + K_2SO_4$

$t = 25°$ (72.5, 247)

% K_2SO_4	% $ZnSO_4$
$ZnSO_4.7H_2O$	
0.0	37.00
1.00	35.60
$ZnSO_4.7H_2O + ZnSO_4.K_2SO_4.6H_2O$	
1.48	35.30
$ZnSO_4.K_2SO_4.6H_2O$	
2.48	25.90
3.40	17.90
4.80	9.10
6.33	6.00
7.53	3.90
$ZnSO_4.K_2SO_4.6H_2O + K_2SO_4$	
8.33	3.00
K_2SO_4	
10.90	2.00
10.80	0.0

SO_4^{--} Hg^+

$H_2O + H_2SO_4 + Hg_2SO_4$

$t = 25°C$ (110)

M $\frac{1}{2}H_2SO_4$/l	M $\frac{1}{2}Hg_2SO_4$/l
Hg_2SO_4	
0.0	0.001171
0.04	0.000831
0.10	0.000878
0.20	0.000804

SO_4^{--} Hg^+

$H_2O + Hg_2O + Hg_2SO_4$

$t = 15–20°C$ (89)

M_{SO_3}/l	M_{Hg}/l
$Hg_2O.SO_3 + 2Hg_2O.SO_3.H_2O$	
0.002	0.00214
$2Hg_2O.SO_3.H_2O$	
0.0019	0.00198
0.0016	0.00177
0.0009	0.00098
0.00009	0.00024
$2Hg_2O.SO_3.H_2O + Hg_2O$	
0.00005	0.000177

SO_4^{--} Cd^{++} Fe^{++}

$H_2O + CdSO_4 + FeSO_4$; *v.* Fig. 108

$t = 25°C$ (368)

	Solid phases	Solid phases: $CdSO_4$	Solid phases: $FeSO_4$	Solid phases: H_2O	Liquid phase: $CdSO_4$	Liquid phase: $FeSO_4$	Liquid phase: H_2O
		Composition in M of:					
A	$FeSO_4.7H_2O$		1	7		3.165	100
B	Solid soln. I*	0.048	0.952	7			
C	Solid soln. I*	0.111	0.889	7			
D	Solid soln. I*	0.346	0.654	7			
E	Solid soln. I*	0.366	0.634	7	4.98	1.26	100
F	Solid soln. II†	0.991	0.009	8/3			
G	$CdSO_4.\frac{8}{3}H_2O$	1	0	8/3	6.51		100

* Solid soln. I (monoclinic) containing from 0 to 36.5 % $CdSO_4$.
† Solid soln. II (monoclinic) containing from 99.1 to 100 % $CdSO_4$.

SO_4^{--} Cd^{++} Na^+; *v.* p. 340

SO_4^{--} Hg^{++} (210)

$H_2O + H_2SO_4 + HgO$; *v.* Fig. 109

	Solid phases	Liquid phase, $t = 25°C$: % HgO	% SO_3	Liquid phase, $t = 50°C$: % HgO	% SO_3
A	$3HgO.SO_3$	3.68	5.10	1.94	4.06
	$3HgO.SO_3$	9.22	9.32	9.35	11.23
	$3HgO.SO_3$	22 87m	17.40m	16 56	15.85
	$3HgO.SO_3 + 3HgO.2SO_3.2H_2O$	17.38	14.15	17.26	18.44
B	$3HgO.2SO_3.2H_2O$, at 25°C; $HgO.SO_3$, at 50°C	17.00	15.44	18.07	17.93
	$3HgO.2SO_3.2H_2O$, at 25°C; $HgO.SO_3$, at 50°C	17.16	17.98		
	$3HgO.2SO_3.2H_2O$, at 25°C; $HgO.SO_3$, at 50°C	17.15	19.90		
C	$3HgO.2SO_3.2H_2O + HgO.SO_3.H_2O$	16.69	20.67		
D	$3HgO.2SO_3.2H_2O + HgO.SO_3$			18.03	19.30
	$HgO.SO_3.H_2O$	15.08	21.35		
	$HgO.SO_3$	2.35	32.81	17.78	19.67
	$HgO.SO_3$	0.23	44.66	11.60	22.41
	$HgO.SO_3$			2.01	32.95
E	$HgO.SO_3.H_2O + HgO.SO_3$	5.36	26.71		
F	$3HgO.SO_3 + HgO.SO_3$			20.53	18.60

$t = 25°C$ (89)

M_{HgO}/l	M_{SO_3}/l	M_{HgO}/l	M_{SO_3}/l
$HgO.SO_3 + 3HgO.SO_3$		$3HgO.SO_3$	
1.102	3.435	0.0979	0.398
$3HgO.SO_3$		0.0007	0.0129
0.060	2.327	$3HgO.SO_3 + HgO$	
0.1976	0.717	0.00015	0.00063

SO_4^{--} Cu^{++}

$H_2O + H_2SO_4 + Cu(OH)_2$; *v.* Fig. 110

$t = 25°C$ (32); *v. also* p. 341

	Solid phases	Liquid phase: % CuO	% SO_3
A	Basic salts	1.165	
B	Basic salts	8.720	
C	$CuSO_4.5H_2O$	9.17	9.26
D	$CuSO_4.5H_2O$	3.39	23.09
E	$CuSO_4.5H_2O + CuSO_4.3H_2O$		41.29
F	$CuSO_4.3H_2O$	1.38	43.63
G	$CuSO_4.3H_2O$	1.02	47.82
H			49.97
I	$CuSO_4.H_2O$	0.109	62.14
J	$CuSO_4.H_2O$	0.15	72.41
K	$CuSO_4$	0.07	74.26

SO_4^{--} Cu^{++} Mn^{++} (213)

$H_2O + CuSO_4 + MnSO_4$; *v.* Fig. 111

Solid solns.*	Solid phases: $CuSO_4$	$MnSO_4$	H_2O	Liquid phase: $CuSO_4$	$MnSO_4$	H_2O
	Composition in M of:					
	$t = 0°C$					
		1.00	7		1.0	15.12
	0.029	0.971	7	0.022	0.978	16.05
	0.095	0.905	7	0.045	0.955	16.74
I†	0.202	0.798	7	0.101	0.899	18.08
	0.273	0.727	7	0.152	0.848	19.02
	0.329	0.671	7	0.221	0.779	19.95
	0.360	0.640	7	0.290	0.710	20.40
	0.780	0.220	5			
	0.787	0.213	5	0.301	0.699	21.61
	0.823	0.177	5	0.376	0.624	26.17
II‡	0.866	0.134	5	0.466	0.534	30.59
	0.893	0.107	5	0.603	0.397	36.40
	0.936	0.064	5	0.756	0.244	41.16
	1.000		5	1.000		46.47
	$t = 17°C$					
		1.0	5		1.00	13.08
	0.048	0.952	5	0.031	0.969	13.37
III‡	0.071	0.929	5	0.064	0.936	13.46
	0.090	0.910	5	0.08	0.920	13.50
	0.185	0.815	7			
	0.191	0.809	7	0.085	0.915	13.61
IV†	0.205	0.795	7	0.112	0.888	14.31
	0.245	0.755	7	0.162	0.838	14.72
	0.270	0.730	7	0.190	0.810	14.80
	0.560	0.443	5			
	0.567	0.433	5	0.191	0.809	15.05
	0.621	0.379	5	0.237	0.763	17.88
	0.700	0.300	5	0.318	0.682	21.18
V‡	0.756	0.244	5	0.425	0.575	25.19
	0.848	0.152	5	0.573	0.427	30.22
	0.946	0.054	5	0.821	0.179	37.35
	1.000		5	1.000		39.48

* Solid soln. are I, II, etc., as indicated.
† Monoclinic.
‡ Triclinic.

Transition temperatures (88.5)

At 9°C, $MnSO_4.7H_2O \rightarrow MnSO_4.5H_2O$.
At 26°C, $MnSO_4.5H_2O \rightarrow MnSO_4.4H_2O$.

SO_4^{--} Cu^{++} Ca^{++}; SO_4^{--} Cu^{++} Li^+; SO_4^{--} Cu^{++} Na^+; SO_4^{--} Cu^{++} K^+; *v.* p. 341, 342

SO_4^{--} Cd^{++} Na^+ (233)

$H_2O + CdSO_4 + Na_2SO_4$

Solid phases	Liquid phase—determinations largely mean of several results											
	t = −14.8°C		t = 0°C		t = 5°C		t = 10°C		t = 15°C		t = 20°C	
	% $CdSO_4$	% Na_2SO_4	% $CdSO_4$	% Na_2SO_4	% $CdSO_4$	% Na_2SO_4	% $CdSO_4$	% Na_2SO_4	% $CdSO_4$	% Na_2SO_4	% $CdSO_4$	% Na_2SO_4
$CdSO_4.Na_2SO_4.2H_2O + Na_2SO_4.10H_2O$	40.18	4.60										
$CdSO_4.\frac{8}{3}H_2O + CdSO_4.Na_2SO_4.2H_2O$			40.35	4.85	40.31	4.76	39.91	5.24	40.27	5.15	40.26	5.16
$CdSO_4.Na_2SO_4.2H_2O + Na_2SO_4.10H_2O$	30.81*	9.52*	37.30	6.54	35.35	7.42	32.53	8.69	28.32	10.93	22.69	14.72

Solid phases	Liquid phase—determinations largely mean of several results									
	t = 24°C		t = 25°C		t = 30°C		t = 35°C		t = 40°C	
	% $CdSO_4$	% Na_2SO_4	% $CdSO_4$	% Na_2SO_4	% $CdSO_4$	% Na_2SO_4	% $CdSO_4$	% Na_2SO_4	% $CdSO_4$	% Na_2SO_4
$CdSO_4.\frac{8}{3}H_2O + CdSO_4.Na_2SO_4.2H_2O$			40.00	5.69	39.95	6.00	40.08	6.43	39.90	7.18
$CdSO_4.Na_2SO_4.2H_2O$	22.25	15.07	22.38	15.25	22.55	15.30	22.70	15.45	22.89	15.65
$CdSO_4.Na_2SO_4.2H_2O + Na_2SO_4.10H_2O$	17.72	18.58	16.34	19.82	9.21	27.80	8.28†	29.36†	10.00†	28.47†

Invariant points

°C	Solid phases	Liquid phase	
		% $CdSO_4$	% Na_2SO_4
−17.7	$CdSO_4.\frac{8}{3}H_2O + Na_2SO_4.10H_2O$ + Ice		
−16.9	$CdSO_4.\frac{8}{3}H_2O$ + Ice		
−14.8	$CdSO_4.\frac{8}{3}H_2O + CdSO_4.Na_2SO_4.2H_2O + Na_2SO_4.10H_2O$	40.21	4.59
+31	$Na_2SO_4.10H_2O + CdSO_4.Na_2SO_4.2H_2O + Na_2SO_4$		

* t = +12°C.

† Solid phase = $CdSO_4.Na_2SO_4.2H_2O + Na_2SO_4$.

SO_4^{--} Cu^{++} Na^+ (135)

$H_2O + H_2SO_4 + CuSO_4 + Na_2SO_4$; *v.* Fig. 112 and p. 342

	Solid phases	Liquid phase					
		t = 12°C			t = 25°C		
		% $CuSO_4$	% H_2SO_4	% Na_2SO_4	% $CuSO_4$	% H_2SO_4	% Na_2SO_4
A	$CuSO_4.5H_2O$	16.15			18.47		
B	$CuSO_4.5H_2O + CuSO_4.3H_2O$	1.64	51.50		2.83	49.20	
C	$CuSO_4.3H_2O + CuSO_4.H_2O$	0.81	61.54		2.13	55.72	
D	$NaHSO_4.H_2O$		58.79	4.33		56.25	6.54
E	$NaHSO_4.H_2O + Na_3H(SO_4)_2$		27.96	25.42		30.58	27.02
F	$Na_3H(SO_4)_2 + Na_2SO_4$					16.27	35.37
G	$Na_2SO_4 + Na_2SO_4.10H_2O$					8.62	33.48
H	$Na_2SO_4.10H_2O$			9.49			21.90
I	$Na_2SO_4.10H_2O + CuSO_4.Na_2SO_4.2H_2O$				6.28		21.20
J	$CuSO_4.Na_2SO_4.2H_2O + CuSO_4.5H_2O$				16.85		10.95
	$Na_2SO_4.10H_2O + Na_3H(SO_4)_2$		32.93	16.51			
	$Na_2SO_4.10H_2O + CuSO_4.5H_2O$	14.60		10.44			
P	$CuSO_4.5H_2O + CuSO_4.3H_2O + CuSO_4.Na_2SO_4.2H_2O$	1.59	50.54	2.51	2.86	47.08	2.90
Q	$CuSO_4.3H_2O + CuSO_4.H_2O + CuSO_4.Na_2SO_4.2H_2O$	0.73	59.91	2.70	2.17	53.98	2.50
	$CuSO_4.5H_2O + Na_2SO_4.10H_2O + CuSO_4.Na_2SO_4.2H_2O$	8.74	7.41	13.66			
R	$NaHSO_4.H_2O + CuSO_4.Na_2SO_4.2H_2O$	0.77	58.20	4.63	0.78	55.52	6.58
S	$Na_3H(SO_4)_2 + NaHSO_4.H_2O + CuSO_4.Na_2SO_4.2H_2O$	0.11	27.92	25.42	0.18	30.46	27.00
T	$Na_2SO_4 + Na_3H(SO_4) + CuSO_4.Na_2SO_4.2H_2O$	0.15	16.52	32.91			
	$Na_2SO_4 + Na_3H(SO_4)_2 + CuSO_4.Na_2SO_4.2H_2O$				0.19	16.19	35.86
U	$Na_2SO_4.10H_2O + Na_2SO_4 + CuSO_4.Na_2SO_4.2H_2O$				0.44	8.58	33.30

SO_4^{--} Cu^{++}.—(*Continued from p. 339*)

t = 25°C (134)

% $CuSO_4$	% H_2SO_4
$CuSO_4.5H_2O$	
18.47	0
12.62	11.41
5.92	25.53
3.25	36.77
2.63	42.15
2.59	47.66
$CuSO_4.5H_2O + CuSO_4.3H_2O$	
2.83	49.23
$CuSO_4.3H_2O$	
2.70	50.23
2.19	54.78
$CuSO_4.3H_2O + CuSO_4.H_2O$	
2.13	55.72
$CuSO_4.H_2O$	
0.95	61.79
0.17	77.93
0.15	83.29
0.19	85.46
$CuSO_4.H_2O + CuSO_4$	
0.43	85.76
$CuSO_4$	
0.40	86.04
0.19	92.70

SO_4^{--} Cu^{++} Ca^{++}

$H_2O + CuSO_4 + Ca(OH)_2$

t = 25°C (30)

g CaO/l	g SO_3/l
$CaO.H_2O + CuO.(H_2O)_x$, blue	
1.20	0.0
1.78	0.872
$CaO.H_2O + CuO.(H_2O)_x.$-$CaSO_4.2H_2O$	
1.908	1.060
$CaSO_4.2H_2O + CuO.(H_2O)_x$, blue	
1.888	1.052
1.816	1.032
1.420	1.084
1.358	1.112
$CaSO_4.2H_2O + CuO.(H_2O)_x$, green	
1.120	1.144
1.008	1.156
0.880	1.280

SO_4^{--} Cu^{++} Ca^{++}

$H_2O + CuSO_4 + CaSO_4$

t = 25°C (30)

% $CaSO_4$	% $CuSO_4$
$CaSO_4.2H_2O$	
0.2064	0.1142
0.1976	0.3546
0.1930	0.6005
0.1841	0.7214
0.1732	1.4581
0.1700	1.9323
0 1639	2.8682
0.1650	3.7855
0.1659	4.6980
0.1679	5.5495
0.1758	8.9207

SO_4^{--} Cu^{++} Ca^{++}.—(*Cont'd*)

% $CaSO_4$	% $CuSO_4$
$CaSO_4.2H_2O$	
0.1787	12.803
0.1741	16.444
$CaSO_4.2H_2O + CuSO_4.5H_2O$	
0.1714	18.466
t = 25°C (162)	
$CaSO_4.2H_2O$	
0.20854	0.0
0.18435	0.1996
0.1671	0.7922
0.1661	1.5842
0.17468	3.267
0.1944	13.465

SO_4^{--} Cu^{++} Li^+

$H_2O + CuSO_4 + Li_2SO_4$

t = 30°C (338)

% $CuSO_4$	% Li_2SO_4
$CuSO_4.5H_2O$	
20.32	0.0
17.50	3.54
16.10	6.08
13.55	11.94
12.14	15.72
11.04	17.92
$CuSO_4.5H_2O + Li_2SO_4.H_2O$	
10.07	20.52
$Li_2SO_4.H_2O$	
6.41	22.23
3.39	23.59
0.0	25.24

SO_4^{--} Ag^+

$H_2O + H_2SO_4 + Ag_2SO_4$

t = 25°C (110)

M ½H_2SO_4/l	M ½Ag_2SO_4/l
Ag_2SO_4	
0.0	0.0257
0.02	0.0260
0.04	0.0264
0.10	0.0271
0.20	0.0275

SO_4^{--} Ag^+ $Cr_2O_7^{--}$

$H_2O + Ag_2SO_4 + Ag_2Cr_2O_7$

t = 25°C (389)

g Ag/l	g SO_4/l	g Cr_2O_7/l
Ag_2SO_4		
6.484	1.476	
Solid soln. I		
6.580	1.4772	0.296
6.484	1.46664	0.296
Solid soln. I + $Ag_2Cr_2O_7$		
6.448	1.4664	0.272
$Ag_2Cr_2O_7$		
6.520	1.4468	0.304
5.524	1.4304	0.372
0.2332		0.920

SO_4^{--} Ag^+ Ca^{++} K^+

$H_2O + Ag_2SO_4 + CaSO_4 + K_2SO_4$; t = 25°C (94)

M per 1000M H_2O

Ag_2SO_4	K_2SO_4	$CaSO_4$
$CaSO_4.2H_2O + CaSO_4.$-$K_2SO_4.H_2O + Ag_2SO_4$		
0.551	3.35	0.242

SO_4^{--} Cu^{++} Na^+; *v.* p. 340 and 342

SO_4^{--} Cu^{++} K^+ (73)

$H_2O + CuSO_4 + K_2SO_4$

Solid phases	Liquid phase—M per 1000M H_2O					
	t = 25°C		t = 51°C		t = 61°C	
	$CuSO_4$	K_2SO_4	$CuSO_4$	K_2SO_4	$CuSO_4$	K_2SO_4
$CuSO_4.5H_2O$	1.410		2.073		2.419	
	1.415	0.014				
	1.430	0.037				
	1.457	0.086				
	1.477	0.110				
	1.504	0.150				
$CuSO_4.5H_2O$ + $CuSO_4.$-$K_2SO_4.6H_2O$	1.570	0.225	2.266	0.618	2.586	0.838
$CuSO_4.K_2SO_4.6H_2O$	1.525	0.228	0.677	0.706	0.728	0.932
	1.149	0.261				
	0.955	0.270				
	0.365	0.331				
	0.350	0.350				
	0.237	0.412				
	0.120	0.598				
$CuSO_4.K_2SO_4.6H_2O$ + K_2SO_4	0.092	0.737	0.312	1.036	0.422	1.187
K_2SO_4	0.060	0.708		0.923		1.064
		0.661				

SO_4^{--} Ag^+ Na^+ (20)

$H_2O + Ag_2SO_4 + Na_2SO_4$; liquid phase in g per 100g H_2O

t = 33°C		t = 51°C		t = 75°C		t = 100°C	
Ag_2SO_4	Na_2SO_4	Ag_2SO_4	Na_2SO_4	Ag_2SO_4	Na_2SO_4	Ag_2SO_4	Na_2SO_4
Solid soln.							
0.972	5.345	1.173	5.407	1.458	5.368	1.651	5.336
1.150	10.056	1.377	10.116	1.697	9.813	2.012	10.153
1.320	15.185	1.572	15.146	1.934	15.260	2.312	15.532
1.448	20.093	1.705	20.247	2.075	19.978	2.351	25.452
1.548	25.412	1.787	25.196	2.161	25.556	2.260	29.714
1.570	29.556	1.802	29.230	2.138	29.662	2.012	34.718
1.549	34.732	1.727	34.625	1.910	35.278	1.687	38.635
1.462	39.447	1.540	39.302	1.603	38.944	1.158	40.160
1.199	44.693	1.188	42.914	1.156	41.365		
0.932	46.976	0.882	44.464				

For temperatures above 33°C, Barre (20) found a continuous series of solid solutions for the concentrations studied; the curves representing the ratios of Na_2SO_4 to Ag_2SO_4 in solutions saturated with this solid all showed a maximum corresponding to the points at which the solid phase contained 40% Na_2SO_4. Below 33°C the solubility of Ag_2SO_4 increased with increasing Na_2SO_4.

SO_4^{--} Ag^+ K^+

$H_2O + Ag_2SO_4 + K_2SO_4$

t = 25°C (110)

M ½K_2SO_4/l	M ½Ag_2SO_4/l
Ag_2SO_4	
0.0	0.0257
0.02	0.0246
0.04	0.0236
0.10	0.0231
0.20	0.0232

SO_4^{--} Mn^{++} Na^+

$H_2O + MnSO_4 + Na_2SO_4$

t = 35°C (346)

% $MnSO_4$	% Na_2SO_4
$MnSO_4.H_2O$	
39.45	0.0
33.92	5.23
$MnSO_4.H_2O + 9MnSO_4.$-$10Na_2SO_4$	
32.91*	7.70*

SO_4^{--} Mn^{++} Na^+.—(*Cont'd*)

% $MnSO_4$	% Na_2SO_4
$9MnSO_4.10Na_2SO_4$	
31.05	9.20
27.67	10.76
22.14	14.28
14.58	20.01
$9MnSO_4.10Na_2SO_4$ + $MnSO_4.3Na_2SO_4$	
13.96	21.91
$MnSO_4.3Na_2SO_4$	
12.19	22.49
10.45	23.41
7.43	26.58
5.69	29.31
$MnSO_4.3Na_2SO_4 + Na_2SO_4$	
5.11	30.52
Na_2SO_4	
2.96	31.33
0	33.0

* Average of several determinations.

SO_4^{--} Cu^{++} Na^{+} (232, 345)

$H_2O + CuSO_4 + Na_2SO_4$; *v.* Fig. 113

Solid phases	Liquid phase (232)*—% A = % $CuSO_4$; % B = % Na_2SO_4 (largely mean of two or more results)									
	t = 0°C		t = 10°C		t = 12°C		t = 15°C		t = 17.7°C	
	% A	% B	% A	% B	% A	% B	% A	% B	% A	% B
$CuSO_4.5H_2O + Na_2SO_4.10H_2O$	13.40	6.23	14.90	9.46	14.83	9.82	15.09	11.64		
$CuSO_4.5H_2O + CuSO_4.Na_2SO_4.2H_2O$									14.99	13.48?
$CuSO_4.Na_2SO_4.2H_2O$									14.34	13.34
	t = 26°C				t = 32.2°C					
$CuSO_4.Na_2SO_4.2H_2O + Na_2SO_4.10H_2O$	5.51	22.45			1.47	32.44				

Solid phases	Liquid phase (232)*—% A = % $CuSO_4$; % B = % Na_2SO_4 (largely mean of two or more results)							
	t = 19.5°C		t = 23°C		t = 30°C		t = 40.15°C	
	% A	% B	% A	% B	% A	% B	% A	% B
$CuSO_4.5H_2O + CuSO_4.Na_2SO_4.2H_2O$	15.62	12.06	16.40	11.35	17.97	9.95	20.56	
$CuSO_4.Na_2SO_4.2H_2O$	14.54	12.90	14.37	12.76	14.07	12.37	13.73	12.26
$CuSO_4.Na_2SO_4.2H_2O + Na_2SO_4.10H_2O$	11.84	15.12	8.19	18.72	2.61	28.38		

Solid phases	Liquid phase—g per 100g H_2O (345)—A = $CuSO_4$; B = Na_2SO_4							
	t = 15°C		t = 20°C†		t = 25°C		t = 35°C	
	A	B	A	B	A	B	A	B
$CuSO_4.5H_2O$	16.05	0	17.52	0	18.24	0	21.06	0
$CuSO_4.5H_2O + CuSO_4.Na_2SO_4.2H_2O$			15.54	11.85	16.86	10.97	19.28	8.98
$CuSO_4.Na_2SO_4.2H_2O + Na_2SO_4.10H_2O$			11.22	15.45	6.28	21.18		
$CuSO_4.5H_2O + Na_2SO_4.10H_2O$	14.88	11.42						
$Na_2SO_4.10H_2O$	0	11.63	0	16.25	0	21.89		
$CuSO_4.Na_2SO_4.2H_2O + Na_2SO_4$							1.46	32.12
Na_2SO_4							0	33.07

* Some of these data were compiled by Koppel (232) from other sources. † Data from Massink (255).

Invariant points (232)

°C	Solid phases	Liquid phase	
		% $CuSO_4$	% Na_2SO_4
− 3	$CuSO_4.5H_2O + Na_2SO_4.10H_2O$ + Ice		
− 2	$CuSO_4.5H_2O$ + Ice		
+16 7	$CuSO_4.5H_2O + CuSO_4.Na_2SO_4.2H_2O + Na_2SO_4.10H_2O$	15.02	12.62
32	$Na_2SO_4.10H_2O + CuSO_4.Na_2SO_4.2H_2O + Na_2SO_4$		

SO_4^{--} Mn^{++} K^{+}

$H_2O + MnSO_4 + K_2SO_4$

t = 25°C (72.5)

% $MnSO_4$	% K_2SO_4
K_2SO_4	
0	10.59
6.30	11.27
15.22	12.04
$K_2SO_4 + K_2SO_4.MnSO_4.6H_2O$	
16.58	12.31
$K_2SO_4.MnSO_4.6H_2O$	
19.27	10.06
30.47	5.27
35.58	4.30
37.28	4.20
$MnSO_4.4H_2O + K_2SO_4.MnSO_4.6H_2O$	
37.92	4.15
$MnSO_4.4H_2O$	
38.21	3.03
38.42	2.46
38.54	1.87

SO_4^{--} Mn^{++} K^{+}.—(*Cont'd*)

% $MnSO_4$	% K_2SO_4
$MnSO_4.4H_2O$	
39.03	0.43
39.10	0

SO_4^{--} MnO_4^{-} Na^{+} K^{+}

$H_2O + Na_2SO_4 + KMnO_4$

t = 25°C (386)

% $KMnO_4$	% Na_2SO_4
$KMnO_4$	
7.10	0.00
7.33	0.88
7.83	4.62
7.75	7.05
7.67	9.34
7.27	12.85
6.68	17.05
6.25	19.43
$KMnO_4 + Na_2SO_4.10H_2O$	
5.91	21.04
$NaSO_4.10H_2O$	
0.0	21.80

SO_4^{--} MnO_4^{-} K^{+}; *v.* p. 343

SO_4^{--} Fe^{++}: $H_2O + H_2SO_4 + FeO$

t = 25°C (228); *v.* Fig. 114 and p. 343

	Solid phases	Liquid phase	
		% FeO	% SO_3
A	$FeO.SO_3.7H_2O$	5.55	21.56
B	$FeO.SO_3.4H_2O + FeO.SO_3.7H_2O$	4.05	31.78
C	$FeO.SO_3.7H_2O + FeO.SO_3.H_2O$	3.30	34.78
D	$FeO.SO_3.H_2O$	0.026	58.12
E	$FeO.SO_3.H_2O + 2FeO.3SO_3.2H_2O$	0.066	66.98
F	$2FeO.3SO_3.2H_2O$	0.070	70.78
G	$2FeO.3SO_3.2H_2O + FeO.2SO_3.H_2O$	0.09	73.01
H	$FeO.2SO_3.H_2O + FeO.4SO_3.3H_2O$		76.80
I	$FeO.4SO_3.3H_2O$	0.014	79.81

SO_4^{--} Fe^{++} Li^{+}; *v.* p. 343

SO_4^{--} Fe^{++} K^{+} (239): $H_2O + FeSO_4 + K_2SO_4$

Solubility data which seem to indicate that in solutions containing equivalent proportions of $FeSO_4$ and K_2SO_4 the following equilibria exist:

$K_2SO_4.FeSO_4.6H_2O \leftrightarrow K_2SO_4.FeSO_4.4H_2O$ at 30°C.

$K_2SO_4.FeSO_4.4H_2O \leftrightarrow K_2SO_4.FeSO_4.2H_2O$ at 87°C.

$K_2SO_4.FeSO_4.6H_2O \leftrightarrow K_2SO_4.FeSO_4.2H_2O$ at 54°C (metastable).

SO_4^{--} MnO_4^- K^+

$H_2O + K_2SO_4 + KMnO_4$

$t = 25°C$ (386)

% $KMnO_4$	% K_2SO_4
$KMnO_4$	
7.10	0.00
6.59	0.80
5.92	1.98
4.52	4.57
3.87	7.79
$KMnO_4 + K_2SO_4$	
3.55	9.26

SO_4^{--} Fe^{++}

$H_2O + H_2SO_4 + FeSO_4$

$t = 25°C$ (396)

M ½H_2SO_4/l	% $FeSO_4$
$FeSO_4 \cdot 7H_2O$(?)*	
0.0	22.84
2.25	19.03
6.685	13.40
10.20	10.30
$FeSO_4 \cdot H_2O$	
12.46	7.26
15.15	4.015
19.84	0.1522

* Excess of $FeSO_4 \cdot 7H_2O$ used.

SO_4^{--} Fe^{++} Li^+

$H_2O + FeSO_4 + Li_2SO_4$

$t = 30°C$ (343)

% $FeSO_4$	% Li_2SO_4	% $FeSO_4$	% Li_2SO_4
$FeSO_4 \cdot 7H_2O$		$Li_2SO_4 \cdot H_2O$	
24.87	0	15.39	16.80
22.45	4	12.68	18.31
21.15	5.58	5.32	22.15
18.79	11.16	3.74	23.15
16.51	15.81	0	25.10
$FeSO_4 \cdot 7H_2O$ +	$Li_2SO_4 \cdot H_2O$		
16.11*	16.51*		

* Average of two or more results.

SO_4^{--} Fe^{++} Na^+ (233)

$H_2O + FeSO_4 + Na_2SO_4$

Liquid phase (largely mean of two or more results)— % A = % $FeSO_4$; % B = % Na_2SO_4

Solid phases	$t = 0°C$ % A	$t = 0°C$ % B	$t = 15.5°C$ % A	$t = 15.5°C$ % B	$t = 18.8°C$ % A	$t = 18.8°C$ % B	$t = 23°C$ % A	$t = 23°C$ % B	$t = 24.92°C$ % A	$t = 24.92°C$ % B
$FeSO_4 \cdot 7H_2O + Na_2SO_4 \cdot 10H_2O$	14.54	4.95	17.76	11.32						
$FeSO_4 \cdot 7H_2O + FeSO_4 \cdot Na_2SO_4 \cdot 4H_2O$					18.13	13.80	19.58	12.50		
$FeSO_4 \cdot Na_2SO_4 \cdot 4H_2O$									16.22	15.13
$FeSO_4 \cdot Na_2SO_4 \cdot 4H_2O + Na_2SO_4 \cdot 10H_2O$					18.23	14.83	13.83	18.04		

Liquid phase (largely mean of two or more results)— % A = % $FeSO_4$; % B = % Na_2SO_4

Solid phases	$t = 27°C$ % A	$t = 27°C$ % B	$t = 28°C$ % A	$t = 28°C$ % B	$t = 31°C$ % A	$t = 31°C$ % B	$t = 35°C$ % A	$t = 35°C$ % B	$t = 40°C$ % A	$t = 40°C$ % B
$FeSO_4 \cdot 7H_2O + FeSO_4 \cdot Na_2SO_4 \cdot 4H_2O$	20.97	11.30			22.91	9.71	23.85	9.26	26.32	7.85
$FeSO_4 \cdot Na_2SO_4 \cdot 4H_2O$							16.30	14.98	16.37	15.42
$FeSO_4 \cdot Na_2SO_4 \cdot 4H_2O + Na_2SO_4 \cdot 10H_2O$			7.66	24.41	4.58	29.50				
$FeSO_4 \cdot Na_2SO_4 \cdot 4H_2O + Na_2SO_4$							4.04	30.49	4.09	30.67

Invariant points

°C	Solid phases	Liquid phase % $FeSO_4$	Liquid phase % Na_2SO_4
− 3	$FeSO_4 \cdot 7H_2O + Na_2SO_4 \cdot 10H_2O$ + Ice		
− 2	$FeSO_4 \cdot 7H_2O$ + Ice		
+18.5	$FeSO_4 \cdot 7H_2O + FeSO_4 \cdot Na_2SO_4 \cdot 4H_2O + Na_2SO_4 \cdot 10H_2O$	18.07	13.95
31.4	$Na_2SO_4 \cdot 10H_2O + FeSO_4 \cdot Na_2SO_4 \cdot 4H_2O + Na_2SO_4$		

SO_4^{--} Fe^{+++} (300)

$H_2O + SO_3 + Fe_2(SO_4)_3$; *v.* Figs. 115 and 116

Liquid phase

Solid phases	$t = 50°C$ % Fe_2O_3	$t = 50°C$ % SO_3	$t = 75°C$ % Fe_2O_3	$t = 75°C$ % SO_3	$t = 110°C$ % Fe_2O_3	$t = 110°C$ % SO_3	$t = 140°C$; *v.* Fig. 115 % Fe_2O_3	$t = 140°C$; *v.* Fig. 115 % SO_3	$t = 200°C$ % Fe_2O_3	$t = 200°C$ % SO_3
$Fe_2O_3 \cdot H_2O$	0.14	0.39	0.34	1.00	0.01*	0.53*				
	0.39	0.79								
	0.90	1.53								
$Fe_2O_3 \cdot H_2O + 3Fe_2O_3 \cdot 4SO_3 \cdot 9H_2O$(?)	1.44	2.30	0.93	1.62	0.08†	0.83†				
Fe_2O_3							0.01	0.82	0.56	4.90
							0.03	1.34		
							0.05	2.60		
$Fe_2O_3 + Fe_2O_3 \cdot 2SO_3 \cdot H_2O$									0.63	5.58
$3Fe_2O_3 \cdot 4SO_3 \cdot 9H_2O$	2.59	4.08	1.72	2.79	5.58	8.93	1.18	4.06		
	5.71	9.09	3.40	5.24			1.71	5.25		
	7.19	11.19	5.54	8.88			3.51	8.25		
	15.43	20.08	9.46	14.95			7.78	14.31		
	16.09	20.81	11.23	17.73			9.84	17.65		

SO_4^{--} Fe^{+++}.—(*Continued*)

Solid phases	Liquid phase, t = 50°C, % Fe_2O_3	t = 50°C, % SO_3	t = 75°C, % Fe_2O_3	t = 75°C, % SO_3	t = 110°C, % Fe_2O_3	t = 110°C, % SO_3	t = 140°C; *v.* Fig. 115, % Fe_2O_3	t = 140°C, % SO_3	t = 200°C, % Fe_2O_3	t = 200°C, % SO_3
$3Fe_2O_3.4SO_3.9H_2O + Fe_2O_3.2SO_3.5H_2O$	17.96	22.96	17.78	23.10						
$3Fe_2O_3.4SO_3.9H_2O + Fe_2O_3.2SO_3.H_2O$					14.31	22.71				
$Fe_2O_3.2SO_3.H_2O$					17.08	27.42	12.05	22.39	1.61	9.08
					19.74	30.80	15.35	30.88	1.69	11.39
					19.04	30.97			3.50	19.43
									2.40	23.78
									2.59	33.14
									2.00	41.87
									2.00	45.05
									1.91	48.94
$Fe_2O_3.2SO_3.5H_2O$	20.13	27.18								
$2Fe_2O_3.5SO_3.17H_2O$	20.70	28.40								
$2Fe_2O_3.5SO_3.17H_2O + Fe_2O_3.2SO_3.5H_2O$			20.93	30.11						
$2Fe_2O_3.5SO_3.17H_2O + Fe_2O_3.3SO_3.7H_2O$	16.78	30.72								
$Fe_2O_3.3SO_3.7H_2O$	10.26	31.91								
	8.56	32.52								
$Fe_2O_3.3SO_3.7H_2O + Fe_2O_3.3SO_3.6H_2O$			18.13	32.32						
$Fe_2O_3.3SO_3.6H_2O$					10.22	32.03	3.71	37.10		
					3.47	35.07	1.02	47.67		
					1.26	41.38				
$Fe_2O_3.3SO_3.6H_2O + Fe_2O_3.4SO_3.9H_2O$			4.59	35.51						
$Fe_2O_3.4SO_3.9H_2O$	5.55	33.96	0.71	38.68	0.81	45.45				
	0.34	41.18	0.15	47.61	0.43	48.03				
	0.10	48.44	0 12	54.63	0.48	53.45				
	0.09	55.34								
$Fe_2O_3.3SO_3.6H_2O + Fe_2O_3.3SO_3$							0.64	53.31		
$Fe_2O_3.3SO_3$							0.36	58.00	1.35	52.12
							0.16	61.01	0.85	53.44
							0.11	65.49	0.08	68.14
							0.08	74.95	0.05	73.54
									0.03	74.88
									0 04	76.17
$Fe_2O_3.4SO_3.3H_2O$	0.07	59.20	0.12	56.25	0.15	59.80				
	0.08	62.34	0.07	61.73	0.13	61.96				
	0.07	75.37	0.07	74.14	0.09	67.54				
					0.06	72.50				

* Solid phase both crystalline and amorphous. † $Fe_2O_3.H_2O$ crystalline in solid phase.

SO_4^{--} Fe^{+++} (9): $H_2O + H_2SO_4 + Fe_2O_3$; *v.* Fig. 116

	Solid phases*	Liquid phase, 18°C, % Fe_2O_3	18°C, % SO_3	25°C, % Fe_2O_3	25°C, % SO_3
A	$Fe_2O_3.4SO_3.9H_2O$	0.21	40.64	0.27	39.77
		0.91	36.45	0.71	37.22
		6.48	32.43	2.38	34.99
D		8.00	31.85	3.88	33.20
	$Fe_2O_3.4SO_3.9H_4O + Fe_2O_3.3SO_3.7H_2O$	9.63	31.88		
	$Fe_2O_3.3SO_3.7H_2O$	11.69	30.80	8.04	32.06
		13.88	29.71	10.55	30.77
E		17.48	29.73	13.80	30.02

	Solid phases*	Liquid phase, 18°C, % Fe_2O_3	18°C, % SO_3	25°C, % Fe_2O_3	25°C, % SO_3
F	$7Fe_2O_3.15SO_3$			17.52	29.85
				18.56	29.98
	$Fe_2O_3.3SO_3.7H_2O$ + basic solid solution	18.68	29.64		
	Basic solid soln.	17.96	25.42	19.98	29.19
		14.00	17.71	19.78	27.90
		11.60	13.85	15.53	17.62
		6.81	7.60	13.51	14.58
G				7.91	8.19

* Cameron and Robinson (65) found $Fe_2O_3.4SO_3.10H_2O$, $Fe_2O_3.3SO_3.10H_2O$ and no definite basic salts. Recoura (306) found two isomeric forms of $Fe_2O_3.3SO_3.9H_2O$ and $7Fe_2O_3.18SO_3.H_2O$. Wirth and Bakke (399) found $Fe_2O_3.4SO_3.9H_2O$, $Fe_2O_3.4SO_3.3H_2O$, $Fe_2O_3.3SO_3.9H_2O$, $Fe_2O_3.5SO_3.18H_2O$, $3Fe_2O_3.8SO_3.27H_2O$, and $Fe_2O_3.0.8SO_3$.

SO_4^{--} Fe^{+++} Al^{+++}: $H_2O + Fe_2(SO_4)_3 + Al_2(SO_4)_3$; t = ? (400)

% $Al_2(SO_4)_3$	% $Fe_2(SO_4)_3$	% $Al_2(SO_4)_3$	% $Fe_2(SO_4)_3$
$Al_2(SO_4)_3$		$Al_2(SO_4)_3 + 2Fe_2O_3.5SO_3.18H_2O$	
27.82	0.00	10.46	31.90
24.21	9.82	$2Fe_2O_3.5SO_3.18H_2O$	
21.64	13.02	8.82	34.02
15.22	23.28	5.20	38.83
		0.00	44.97

SO_4^{--} Fe^{+++} Al^{+++} K^+ (212)

$H_2O + Fe_2K_2(SO_4)_4 + Al_2K_2(SO_4)_4$; *v.* Fig. 117

The author determined the vapor pressures of ten solid solutions containing, as determined by analysis, from 1.7 to 95.8% of the aluminium-containing component. He calculated the relative proportions of the two components, in the solutions from which these solids separated, from the volumes of saturated solutions of the component salts used in preparing the mixtures. The relation between the composition of the solid and liquid phases was shown by a graph (Fig. 117).

SO_4^{--} $Fe(CN_6)^{---}$ Ca^{++} K^+

$H_2O + Ca_3(Fe(CN)_6)_2 + K_2SO_4$

t = 25°C (94)

M per 1000M H_2O

K_2SO_4	$CaSO_4$	$K_3Fe(CN)_6$
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$		
0.26	0.89	6.60

SO_4^{--} $Fe(CN)_6^{----}$ Ca^{++} K^+

$H_2O + Ca_2Fe(CN)_6 + K_2SO_4$

t = 25°C (94)

M per 1000M H_2O

K_2SO_4	$CaSO_4$	$K_4Fe(CN)_6$
$K_2CaFe(CN)_6 + CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$		
3.07	0.28	0.33

SO_4^{--} Ni^{++} K^+

$H_2O + NiSO_4 + K_2SO_4$

t = 25°C (72.5)

% $NiSO_4$	% K_2SO_4
K_2SO_4	
0	10.59
$K_2SO_4 + K_2SO_4.NiSO_4.6H_2O$	
0.33	11.16
$K_2SO_4.NiSO_4.6H_2O$	
1.35	4.93
3.90	4.15
10.15	4.11
15.66	4.75
19.33	5.62
23.09	6.82
$K_2SO_4.NiSO_4.6H_2O + NiSO_4.7H_2O$	
27.90	8.26
$NiSO_4.7H_2O$	
27.92	6.30
27.87	3.82
27.94	0

SO_4^{--} Co^{++} Na^+ (233)

$H_2O + CoSO_4 + Na_2SO_4$

Solid phases	Liquid phase															
	t = 0°C		t = 5°C		t = 10°C		t = 20°C		t = 25°C		t = 30°C		t = 35°C		t = 40°C	
	% $CoSO_4$	% Na_2SO_4	% $CoSO_4$	% Na_2SO_4	% $CoSO_4$	% Na_2SO_4	% $CoSO_4$	% Na_2SO_4	% $CoSO_4$	% Na_2SO_4	% $CoSO_4$	% Na_2SO_4	% $CoSO_4$	% Na_2SO_4	% $CoSO_4$	% Na_2SO_4
$CoSO_4.7H_2O$	20.32		21.90		23.40		26.59		28.22		29.70		31.40		32.82	
$CoSO_4.7H_2O + Na_2SO_4.10H_2O$	16.57	7.64	17.47	9.60	17.90	11.73										
$CoSO_4.7H_2O + CoSO_4.Na_2SO_4.4H_2O$			18.75*	15.61*			19.30	15.10	20.31	13.60	21.67	12.05	22.76	10.43	24.05	9.16
$CoSO_4.Na_2SO_4.4H_2O$							17.58	16.43	17.06	15.70	15.98	14.93	15.72	14.54	14.88	14.22
$CoSO_4.Na_2SO_4.4H_2O + Na_2SO_4.10H_2O$							15.41	18.12	10.63	23.26	6.01	28.67				
$CoSO_4.Na_2SO_4.4H_2O + Na_2SO_4$													4.56	32.15	4.73	31.78

Invariant points

°C	Solid phases	Liquid phase	
		% $CoSO_4$	% Na_2SO_4
− 4.5	$CoSO_4.7H_2O + Na_2SO_4.10H_2O$ + Ice		
− 3	$CoSO_4.7H_2O$ + Ice		
+17.5	$CoSO_4.7H_2O + CoSO_4.Na_2SO_4.4H_2O + Na_2SO_4.10H_2O$	18.57	16.09
31.5	$Na_2SO_4.10H_2O + CoSO_4.Na_2SO_4.4H_2O + Na_2SO_4$		
40.7	$CoSO_4.7H_2O + CoSO_4.6H_2O$		

* t = 18.50°C.

SO_4^{--} Ni^{++} Na^+ (233)

$H_2O + NiSO_4 + Na_2SO_4$

Solid phases	Liquid phase—largely mean of two or more results																	
	t = 0°C		t = 5°C		t = 10°C		t = 18.5°C		t = 20°C		t = 25°C		t = 30°C		t = 35°C		t = 40°C	
	% $NiSO_4$	% Na_2SO_4	% $NiSO_4$	% Na_2SO_4	% $NiSO_4$	% Na_2SO_4	% $NiSO_4$	% Na_2SO_4	% $NiSO_4$	% Na_2SO_4	% $NiSO_4$	% Na_2SO_4	% $NiSO_4$	% Na_2SO_4	% $NiSO_4$	% Na_2SO_4	% $NiSO_4$	% Na_2SO_4
$NiSO_4.7H_2O$	21.39	0																
$NiSO_4.7H_2O + Na_2SO_4.10H_2O$	16.94	7.61	17.99	10.85	18.97	13.86												
$NiSO_4.7H_2O + NiSO_4.Na_2SO_4.4H_2O$							19.62	16.49	20.13	16.16	21.20	14.77	22.60	12.80	23.62	10.78	24.92	9.39
$NiSO_4.Na_2SO_4.4H_2O$									18.76	17.21	17.85	16.54	16.74	15.34	16.28	14.91	15.35	14.49
$NiSO_4.Na_2SO_4.4H_2O + Na_2SO_4.10H_2O$							16.80	18.93	15.49	20.18	10.92	24.12	6.40	28.71				
$NiSO_4.Na_2SO_4.4H_2O + Na_2SO_4$															4.55	31.66	4.64	31.38

SO_4^{--} Ni^{++} Na^+.—(*Continued*)

Invariant points

°C	Solid phases	Liquid phase	
		% $NiSO_4$	% Na_2SO_4
− 5.1	$NiSO_4.7H_2O$ + $Na_2SO_4.10H_2O$ + Ice		
− 4	$NiSO_4.7H_2O$ + Ice		
+16.5	$NiSO_4.7H_2O$ + $NiSO_4.Na_2SO_4.4H_2O$ + $Na_2SO_4.10H_2O$	19.06	17.52
31.5	$NiSO_4.7H_2O$ + $NiSO_4.6H_2O$		
31.8	$Na_2SO_4.10H_2O$ + $NiSO_4.Na_2SO_4.4H_2O$ + Na_2SO_4		

SO_4^{--} $B_4O_7^{--}$ Na^+ (327)

$H_2O + Na_2SO_4 + Na_2B_4O_7$; *v.* Fig. 123

Solid phases	Liquid phase—% A = % $Na_2B_4O_7$; % B = % Na_2SO_4									
	t = 10°C		t = 20°C		t = 25°C		t = 30°C		t = 35°C	
	% A	% B	% A	% B	% A	% B	% A	% B	% A	% B
$Na_2B_4O_7.10H_2O$	1.60		2.52		3.09		3.75		4.83*	
	1.09	1.83	1.11	9.24	2.06	3.22			3.41*	3.67*
	0.81*	4.38*			1.31	12.66			1.73	26.95
					1.23	16.76			1.60	31.64
$Na_2B_4O_7.10H_2O$ + $Na_2SO_4.10H_2O$	0.70*	8.36*	1.00*	16.11*	1.13	21.93	1.27*	28.78*		
$Na_2B_4O_7.10H_2O$ + Na_2SO_4									1.58*	32.25*
$Na_2SO_4.10H_2O$		8.43		16.22	0.33	21.91		28.60		
						21.90				
Na_2SO_4									1.26	32.60
									0.55	32.91
										33.07

Solid phases	Liquid phase—% A = % $Na_2B_4O_7$; % B = % Na_2SO_4									
	t = 45°C		t = 50°C		t = 55°C		t = 65°C		t = 80°C	
	% A	% B	% A	% B	% A	% B	% A	% B	% A	% B
$Na_2B_4O_7.10H_2O$	7.49*		9.52		12.37		17.95			
	4.11	13.99	6.94	7.98	8.47	13.05	10.46	17.08		
			4.76	25.48						
$Na_2B_4O_7.10H_2O$ + Na_2SO_4	3.13*	30.15								
$Na_2B_4O_7.10H_2O$ + $Na_2B_4O_7.5H_2O$					8.06*	16.97*				
$Na_2B_4O_7.5H_2O$					7.58	18.31			23.90	
$Na_2B_4O_7.5H_2O$ + $NaSO_4$					6.49	26.26				
			4.62*	29.00*	5.99*	28.08*	7.91*	26.47*	14.57	22.38
Na_2SO_4	1.15	31.27								
	0.60	31.65								
		32.24	1.87	30.62		31.58		31.05		30.41
				31.90						

Invariant points

°C	Solid phases	Liquid phase	
		% $Na_2B_4O_7$	% Na_2SO_4
− 0.45	$Na_2B_4O_7.10H_2O$ + Ice	1.09	
− 1.38	$Na_2B_4O_7.10H_2O$ + $Na_2SO_4.10H_2O$ + Ice	0.63*	3.83*
− 1.02	$Na_2SO_4.10H_2O$		3.85
+31.9	$Na_2SO_4.10H_2O$ + Na_2SO_4 + $Na_2B_4O_7.10H_2O$	1.41*	32.38*
49.3	$Na_2B_4O_7.10H_2O$ + $Na_2B_4O_7.5H_2O$ + Na_2SO_4	4.58	29.25
102.2†	Na_2SO_4		29.72*
102.9†	$Na_2B_4O_7.5H_2O$	37.08*	
104†	$Na_2B_4O_7.5H_2O$ + Na_2SO_4	28.15*	15.89

* Mean of more than one determination.

† Boiling point.

SO_4^{--} Cr^{+++} Al^{+++} K^+ [212]

$H_2O + Cr_2K_2(SO_4)_4 + Al_2K_2(SO_4)_4$; *v.* Fig. 118

The author determined the vapor pressures of eleven solid solutions containing, as determined by analysis, from 4.5 to 97.6% of the aluminium-containing component. He calculated the relative proportions of the two components in the solutions from which the solids separated from the volumes of saturated solutions of the component salts used in preparing the mixtures. The relation between the composition of the solid and liquid phases was shown by means of a graph (Fig. 118).

SO_4^{--} CrO_4^{--}

$H_2O + H_2SO_4 + H_2CrO_4$; *v.* Fig. 119; t = 25°C [146]

	Solid phases	Liquid phase % CrO_3	Liquid phase % SO_3
A	CrO_3	65.86	0
		50.65	7.78
		31.68	19.63
B		11.82	35.28
C		0.44	55.62
		0.87	62.45
		3.44	65.51
		4.09	65.99
D	$CrO_3.SO_3$	3.96	66.57
		1.97	69.76
		2.60	72.24
		0.85	73.62
E	$CrO_3.SO_3.H_2O$	0.94	78.35
		0.42	79.94
F		1.59	85.32

t = 23°C [264]

% H_2SO_4	% CrO_3	% H_2SO_4	% CrO_3
CrO_3			
14.43	29.25	84.04	1.24
33.96	14.23	92.40	0.11
60.07	1.01	97.20	0.42
79.03	0.79	99.40	0.16

SO_4^{--} CrO_4^{--} Na^+ [377]

$H_2O + Na_2SO_4 + Na_2CrO_4$; *v.* Fig. 120

	Solid phases	Liquid phase t = 15°C % Na_2CrO_4	t = 15°C % Na_2SO_4	t = 25°C % Na_2CrO_4	t = 25°C % Na_2SO_4
A	Solid soln. I*	0.0	11.70	0.0	21.90
		3.92	10.08	2.53	20.12
		8.91	8.35	4.95	18.62
		14.90	6.41	9.66	16.49
		20.03	5.05	14.85	13.87
		28.49	3.18	23.73	10.69
		36.44	0.47		
		37.45	0.0		
B	Solid soln. I + Na_2SO_4			31.70	8.45
	Na_2SO_4			32.34	8.03
				38.59	4.44
C	$Na_2SO_4 + Na_2CrO_4.6H_2O$			42.48	2.79
D	$Na_2CrO_4.6H_2O$			45.76	0.0

* Solid soln. I. Between 0 and 19.52°C, $Na_2SO_4.10H_2O$ and $Na_2CrO_4.10H_2O$ form a continuous series of solid solutions. Between 19.52 and 32.38°C the sulfate dissolves some chromate but the chromate does not dissolve sulfate [289].

Transition temperatures [308]

$Na_2CrO_4.10H_2O \Leftrightarrow Na_2CrO_4.6H_2O$ at 19.52°C.
$Na_2CrO_4.6H_2O \Leftrightarrow Na_2CrO_4.4H_2O$ at 26.6°C.
$Na_2CrO_4.4H_2O \Leftrightarrow Na_2CrO_4$ at 62.8°C.
$Na_2SO_4.10H_2O \Leftrightarrow Na_2SO_4$ at 32.383°C.

SO_4^{--} CrO_4^{--} Na^+.—(*Continued*)

Solid phases [292]	Liquid phase [292] t = 28°C % Na_2CrO_4	t = 28°C % Na_2SO_4	t = 31°C % Na_2CrO_4	t = 31°C % Na_2SO_4	t = 33°C % Na_2CrO_4	t = 33°C % Na_2SO_4
$Na_2SO_4.10H_2O$	0.0	26.31	0.0	30.61		
Solid soln. A *	2.49	24.61	1.35	29.82		
	8.46	20.91	3.05	28.93		
	11.32	19.79	3.78	28.59		
	14.18	18.25	5.05	27.94		
	17.28	16.49	6.38	27.07		
Solid soln. A + Na_2SO_4	21.39†	15.18†	6.52	27.05		
Na_2SO_4	24.54	12.61	8.05	26.05	0.0	33.27
	27.64	10.39	10.95	23.29	4.08	29.85
	32.29	7.35	14.12	20.20	7.03	26.89
	40.61	3.37	19.43	16.33	11.11	23.39
			30.89	8.13	19.73	16.27
			37.95	4.43	25.19	12.61
					35.25	6.16
$Na_2SO_4 + Na_2CrO_4.4H_2O$	44.14†	2.20†	45.75	1.88	45.27	1.49
$Na_2CrO_4.4H_2O$	46.07	0.74				
	46.13	0.0	46.78	0.0	46.75	0.0

* Solid soln. A = $Na_2SO_4.10H_2O + Na_2CrO_4.10H_2O$. † Mean values.

SO_4^{--} CrO_4^{--} K^+

$H_2O + K_2SO_4 + K_2CrO_4$; *v.* Fig. 121; t = 25°C [2]

Solid phases	% K_2CrO_4	Liquid phase—g per 100g H_2O K_2SO_4	K_2CrO_4
K_2SO_4		12.10	0.0
Solid soln	0.33	10.86	1.94
	0.66	10.25	4.36
	1.47	8.98	7.81
	2.55	7.12	14.65
	4.04	5.72	20.83
	6.28	4.82	27.36
	11.98	3.33	40.93
	21.89	2.36	51.81
	38.69	1.84	58.40
	62.28	1.17	61.39
	82.84	0.76	63.09
K_2CrO_4		0.0	64.62

SO_4^{--} MoO_4^{--} K^+

$H_2O + K_2SO_4 + K_2MoO_4$; t = 25°C [2]

Solid phases	% K_2MoO_4	Liquid phase—g per 100g H_2O K_2SO_4	K_2MoO_4
K_2SO_4		12.10	0.0
Solid soln	0.25	8.55	4.73
	0.42	3.95	17.48
	0.82	2.13	45.89
	1.02	1.50	99.49
	1.45	1.27	107.5
	1.67	0.98	127.2
	5.25	0.72	177.0
	17.24	0.46	180.7
K_2MoO_4		0.0	184.6

SO_4^{--} $B_4O_7^{--}$ Na^+; *v.* p. 346

SO_4^{--} Al^{+++}: $H_2O + H_2SO_4 + Al_2(SO_4)_3$; t = 25°C [396]

M ½ H_2SO_4/l	g $Al_2(SO_4)_3$ per g soln.	M ½ H_2SO_4/l	g $Al_2(SO_4)_3$ per g soln.
?*			
0.0	27.82	10.89	5.07
1.1	29.21	15.15	1.216
2.16	26.21	20.10	1.243
4.32	20.44	24.92	2.915
6.17	15.40		

* Excess of $Al_2(SO_4)_3.18H_2O$ used.

SO_4^{--} Al^{+++} K^+

$H_2O + Al_2(SO_4)_3 + K_2SO_4$

t = 25°C (42)

% $Al_2(SO_4)_3$	% K_2SO_4
$Al_2(SO_4)_3.18H_2O$	
27.70	0
28.00	0.98
$Al_2(SO_4)_3.18H_2O + Al_2(SO_4)_3.K_2SO_4.24H_2O$	
30.22	1.93
$Al_2(SO_4)_3.K_2SO_4.24H_2O$	
27.91	1.94
14.98	1.46
11.29	1.45
8.43	1.71
6.14	1.86
4.49	2.27
3.06	3.54
1.85	7.24
1.46	10.57
$Al_2(SO_4)_3.K_2SO_4.24H_2O + K_2SO_4$	
1.33	11.50
K_2SO_4	
0.75	10.69
0	10.75

SO_4^{--} Sc^{+++}

$H_2O + H_2SO_4 + Sc_2(SO_4)_3$

t = 25°C (398)

M ½H_2SO_4/l	g Sc_2O_3/100g of liquid
$Sc_2(SO_4)_3.5H_2O$	
0	10.32
0.5	10.60
1.0	7.192
4.86	3.026
9.73	0.476
$Sc_2(SO_4)_3.3H_2SO_4$	
22.35	0.175

SO_4^{--} Y^{+++} Na^+

$H_2O + Y_2(SO_4)_3 + Na_2SO_4$

t = 25°C (221)

% Na_2SO_4	% $Y_2(SO_4)_3$
$Y_2(SO_4)_3.?H_2O$	
1.21	5.25
3.50	5.79
5.47	6.52
$Y_2(SO_4)_3.?H_2O + Na_2SO_4.Y_2(SO_4)_3.2H_2O$	
7.29	7.21
$Na_2SO_4.Y_2(SO_4)_3.2H_2O$	
6.67	5.16
8.93	3.01
9.99	2.07
11.62	1.75
13.96	1.51
15.33	1.54
16.96	2.45
21.75	1.17

SO_4^{--} La^{+++}

$H_2O + H_2SO_4 + La_2(SO_4)_3$

t = 25°C (395)

M ½H_2SO_4/l	% $La_2(SO_4)_3$
$La_2(SO_4)_3.9H_2O$	
0.0	2.483
0.505	2.934
1.10	3.118
2.16	3.156
3.39	2.465
4.321	1.927
6.685	0.9217
9.68	0.4617
12.60	0.3709
15.15	0.3073

SO_4^{--} La^{+++} Na^+

$H_2O + La_2(SO_4)_3 + Na_2SO_4$

t = 18°C (22)

g per 100g H_2O

$La_2(SO_4)_3$	Na_2SO_4
$La_2(SO_4)_3.?H_2O$	
2.130	0.0
0.997	0.395
0.353	0.689
0.129	1.136
0.044	2.480
0.016	5.548

SO_4^{--} La^{+++} K^+

$H_2O + La_2(SO_4)_3 + K_2SO_4$

t = 16.5°C (22)

g per 100g H_2O

$La_2(SO_4)_3$	K_2SO_4
$La_2(SO_4)_3.?H_2O$	
2.208	0.0
0.727	0.247
0.269	0.496
0.185	0.846
0.054	1.029
0.022	1.156

SO_4^{--} Ce^{+++}

$H_2O + H_2SO_4 + Ce_2(SO_4)_3$

t = 25°C (395)

M ½H_2SO_4/l	% $Ce_2(SO_4)_3$
$Ce_2(SO_4)_3.8H_2O$	
0.0	7.60
0.1	7.618
1.1	6.00
2.16	5.018
4.32	3.301
6.685	1.505
9.68	0.733
15.15	0.239

SO_4^{--} Ce^{+++} Na^+

$H_2O + Ce_2(SO_4)_3 + Na_2SO_4$

t = 19°C (22)

g per 100g H_2O

$Ce_2(SO_4)_3$	Na_2SO_4
$Ce_2(SO_4)_3.?H_2O$	
9.648	0.0
0.637	0.328
0.259	0.684
0.0937	1.091
0.0303	1.699
0.012	2.640
0.0037	7.710

SO_4^{--} Ce^{+++} K^+

$H_2O + Ce_2(SO_4)_3 + K_2SO_4$

t = 16°C (22, 401.2)

g per 100g H_2O

$Ce_2(SO_4)_3$	K_2SO_4
$Ce_2(SO_4)_3.?H_2O$	
10.474	0.0
0.956	0.178
0.432	0.510
0.250	0.726
0.0419	1.290

SO_4^{--} Ce^{++++}

$H_2O + H_2SO_4 + CeO_2$

t = 25°C (365)

g CeO_2/l	g SO_3/l
$CeO_2.SO_3.2H_2O$*	
6.303	20.496
3.693	13.8424
2.245	9.3328
1.4365	6.3792
0.7395	2.4879
0.3560	0.9988
0.2366	0.4775
0.1100	0.2053

* This yellow basic salt was tested for cerous salt with negative result.

SO_4^{--} Sm^{+++}

$H_2O + H_2SO_4 + Sm_2(SO_4)_3$

t = 25°C (395)

M ½H_2SO_4/l	% $Sm_2(SO_4)_3$
$Sm_2(SO_4)_3.8H_2O$	
0.0	3.426
0.1	3.441
0.505	3.352
1.1	3.075
2.16	2.416
6.175	0.7025
12.60	0.1107

SO_4^{--} Gd^{+++}

$H_2O + H_2SO_4 + Gd_2(SO_4)_3$

t = 25°C (395)

M ½H_2SO_4/l	% $Gd_2(SO_4)_3$
$Gd_2(SO_4)_3$	
0.0	2.981
0.1	3.291
0.505	3.931
1.1	3.807
2.16	2.974
6.175	0.8777
12.60	0.0867

SO_4^{--} Er^{+++}

$H_2O + H_2SO_4 + Er_2(SO_4)_3$

t = 25°C (395)

M ½H_2SO_4/l	% $Er_2(SO_4)_3$
$Er_2(SO_4)_3.8H_2O$	
0.0	11.94
0.1	12.02
0.505	10.164
1.10	8.549
2.16	6.473
6.175	1.521
12.60	0.1386

SO_4^{--} Be^{++} (= Gl^{++})

$H_2O + H_2SO_4 + BeSO_4$

t = 25°C (41)

% $BeSO_4$	% H_2SO_4
$BeSO_4.4H_2O$*	
29.94	0
20.51	12.91
15.91	19.17
13.65	22.36
8.61	32.04
5.25	40.34
3.54	46.59
2.04	55.50
0.98	62.02
0.89	66.07
0.86	66.10

t = 25°C (396)

M ½H_2SO_4/l†	% $BeSO_4$
$BeSO_4.6H_2O$	
0.0	8.212
1.1	8.429
2.11	7.944
4.32	6.603
8.70	5.631
10.80	5.773
12.60	6.628
$BeSO_4.4H_2O$	
14.50	5.438
16.96	3.640
19.84	2.244
20.78	2.128
24.92	2.185

* The author states that he could not get any evidence for $BeSO_4.6H_2O$ as given by Wirth (396) and that his values for solubility of $BeSO_4.4H_2O$ were considerably less than those of Wirth.

† Plus an excess of $BeSO_4.6H_2O$.

SO_4^{--} Be^{++} (= Gl^{++})

$H_2O + BeO + BeSO_4$

t = 25°C (361.5)

Gives data for solubility of $BeSO_4.4H_2O$ in solutions containing varying concentrations of BeO.

SO_4^{--} Gl^{++} (= Be^{++}) K^+: $H_2O + GlSO_4 + K_2SO_4$; t = 25°C (45); *v.* Fig. 124

	Solid phases	Liquid phase % K_2SO_4	Liquid phase % $GlSO_4$
A	K_2SO_4	10.75	0.0
		12.31	3.08
		13.38	5.20
		16.51	8.93

SO_4^{--} Gl^{++} (= Be^{++}) K^+.—(*Continued*)

	Solid phases	Liquid phase % K_2SO_4	Liquid phase % $GlSO_4$
B	K_2SO_4 and $K_2SO_4.GlSO_4.2H_2O$	18.42	10.91
	$K_2SO_4.GlSO_4.2H_2O$	17.75	10.74
		16.79	10.69
		15.77	10.34
		11.69	8.93
		10.60	9.40
C		7.74	11.10
		6.14	13.78
		4.64	24.01
D	$K_2SO_4.GlSO_4.2H_2O + GlSO_4.4H_2O$	4.78	26.66
	$GlSO_4.4H_2O$	3.06	28.20
		1.97	28.33
E		0.0	29.94

SO_4^{--} Mg^{++} Ca^{++}: $H_2O + MgSO_4 + CaSO_4$

% $CaSO_4$	% $MgSO_4$	% $CaSO_4$	% $MgSO_4$
t = 25°C (55)		$CaSO_4.2H_2O$	
$CaSO_4.2H_2O$		0.120	16.829
0.204	0	0.1036	19.190
0.161	0.318	0.086	21.450
0.149	0.633	0.068	23.606
0.145	1.052	0.050	25.673
0.144	2.089	$CaSO_4.2H_2O + MgSO_4.7H_2O$	
0.149	4.096	0.038	27.254
0.151	6.036	t = 25°C (162)	
0.149	7.908	$CaSO_4.2H_2O$	
0.145	11.463	0.20854	0.0
0.140	13.155	0.19565	0.06029
0.135	14.435	0.1848	0.12167
0.128	14.839	0.1777	0.18339

SO_4^{--} Mg^{++} Ca^{++} K^+

$H_2O + MgSO_4 + CaSO_4 + K_2SO_4$ (187, 231); *v.* Figs. 125, 126

	Solid phases	Liquid phase % $CaSO_4$	% $MgSO_4$	% K_2SO_4
	t = 25°C; *v.* Fig. 125			
A	$MgSO_4.7H_2O + CaSO_4.2H_2O$	?	26.82	
B	$MgSO_4.7H_2O$		26.76	
C	$K_2SO_4 + CaSO_4.K_2SO_4.H_2O$	?		10.40
D	K_2SO_4			10.77
E	$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$	0.18		3.09
F	$MgSO_4.7H_2O + MgSO_4.K_2SO_4.6H_2O$		26.39	4.02
G	$K_2SO_4 + MgSO_4.K_2SO_4.6H_2O$		12.68	10.70
P	$K_2SO_4 + MgSO_4.K_2SO_4.6H_2O + CaSO_4.K_2SO_4.H_2O$	?	11.35	11.89
	$MgSO_4.7H_2O + MgSO_4.K_2SO_4.6H_2O + CaSO_4.K_2SO_4.H_2O$	?	27.05	3.56
R	$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O + 2CaSO_4.MgSO_4.K_2SO_4.2H_2O$	?	26.36	2.39
	$MgSO_4.7H_2O + CaSO_4.K_2SO_4.H_2O + 2CaSO_4.MgSO_4.K_2SO_4.2H_2O$	?	27.02	3.43
	$MgSO_4.7H_2O + CaSO_4.2H_2O + 2CaSO_4.MgSO_4.K_2SO_4.2H_2O$	?	26.47	2.48
	t = 83°C; *v.* Fig. 126			
A	$MgSO_4.H_2O + CaSO_4$		40.20	
B	$MgSO_4.H_2O$		40.20	
C	$2MgSO_4.K_2SO_4 + MgSO_4.H_2O$		37.04	1.78
D	$K_2SO_4 + MgSO_4.K_2SO_4.4H_2O$		18.56	16.12
E	$K_2SO_4 + CaSO_4.K_2SO_4.H_2O$	?		17.88
F	$CaSO_4.K_2SO_4.H_2O + 5CaSO_4.K_2SO_4.H_2O$	?		8.82
G	$CaSO_4 + 5CaSO_4.K_2SO_4.H_2O$	?		1.19
P	$5CaSO_4.K_2SO_4.H_2O + CaSO_4 + 4CaSO_4.MgSO_4.K_2SO_4.2H_2O$	?	4.03	3.15
Q	$5CaSO_4.K_2SO_4.H_2O + 2CaSO_4.MgSO_4.K_2SO_4.2H_2O + 4CaSO_4.MgSO_4.K_2SO_4.2H_2O$	?	5.12	4.80
R	$CaSO_4.K_2SO_4.H_2O + 5CaSO_4.K_2SO_4.H_2O + 2CaSO_4.MgSO_4.K_2SO_4.2H_2O$	?	2.68	8.00
S	$K_2SO_4 + CaSO_4.K_2SO_4.H_2O + 2CaSO_4.MgSO_4.K_2SO_4.2H_2O$	?	15.48	15.39
T	$K_2SO_4 + MgSO_4.K_2SO_4.4H_2O + 2CaSO_4.MgSO_4.K_2SO_4.2H_2O$	?	18.56	16.12
U	$MgSO_4.K_2SO_4.4H_2O + 2MgSO_4.K_2SO_4 + 2CaSO_4.MgSO_4.K_2SO_4.2H_2O$	?	28.51	7.86
V	$2MgSO_4.K_2SO_4 + MgSO_4.H_2O + 2CaSO_4.MgSO_4.K_2SO_4.2H_2O$	?	37.03	1.78
W	$MgSO_4.H_2O + 2CaSO_4.MgSO_4.K_2SO_4.2H_2O + 4CaSO_4.MgSO_4.K_2SO_4.2H_2O$	?	38.48	0.29
Y	$2MgSO_4.K_2SO_4 + MgSO_4.K_2SO_4.4H_2O$		36.36	7.85

D'Ans (94) obtained for the point R at 25°C, recalculated from M per 1000 M of water, 26.83% of $MgSO_4$ and 2.41% of K_2SO_4. He found the liquid phase at 25°C in equilibrium with the system $CaSO_4.2H_2O + MgSO_4.7H_2O + CaSO_4.K_2SO_4.4H_2O$ to contain 26.99% of $MgSO_4$ and 2.45% of K_2SO_4.

SO_4^{--} Mg^{++} Na^+ (11, 36, 97, 241, 257): $H_2O + MgSO_4 + Na_2SO_4$; *v.* Fig. 127

Liquid phase— % A = % $MgSO_4$; % B = % Na_2SO_4

Solid phases	t = 0°C % A	% B	t = 10°C % A	% B	t = 18.7°C % A	% B	t = 25°C % A	% B	t = 30°C % A	% B	t = 40°C % A	% B	t = 50°C % A	% B	t = 60°C % A	% B	t = 80°C % A	% B	t = 100°C % A	% B
$MgSO_4.12H_2O$	20.64		23.90																	
$MgSO_4.12H_2O$?	20.0	4.30																		
$MgSO_4.7H_2O$					26.2		26.68		29.0		31.3									
					25.7	0.5			24.5	9.27										
					24.4	3.4														
					20.6	11.48														

SO_4^{--} Mg^{++} Na^{+}.—(*Continued*)

Solid phases	Liquid phase— % A = % $MgSO_4$; % B = % Na_2SO_4																			
	t = 0°C		t = 10°C		t = 18.7°C		t = 25°C		t = 30°C		t = 40°C		t = 50°C		t = 60°C		t = 80°C		t = 100°C	
	% A	% B	% A	% B	% A	% B	% A	% B	% A	% B	% A	% B	% A	% B	% A	% B	% A	% B	% A	% B
$MgSO_4.7H_2O + Na_2SO_4.10H_2O$	19.90	4.35	20.9	7.46	20.57	11.80														
$MgSO_4.7H_2O + MgSO_4.Na_2SO_4.4H_2O$							21.14	12.96	23.25	12.35	28.0	8.5								
$MgSO_4.6H_2O$													33.50		35.50					
													31.10	6.06	33.80	3.55				
$MgSO_4.6H_2O + MgSO_4.Na_2SO_4.4H_2O$													31.3	5.70	33.8	4.60				
$MgSO_4.H_2O$																	38.6		40.6	
$MgSO_4.Na_2SO_4.\frac{5}{2}H_2O$																	36.3	4.9	32.0	6.07
																	33.25	6.25	31.1	6.50
																	24.06	12.60	23.2	12.55
																	18.10	17.85		
																	16.40	19.70		
																	14.70	22.0		
$MgSO_4.Na_2SO_4.\frac{5}{2}H_2O + MgSO_4.3Na_2SO_4$																	14.55	22.3	16.9	19.4
$MgSO_4.Na_2SO_4.4H_2O$									15.8	18.6	24.8	10.35	28.3	7.1	25.9	9.60				
									15.80	18.60	15.35	19.14	24.4	11.1	23.10	12.0				
											12.20	23.20	18.4	16.05	18.2	15.80				
													16.35	18.70	15.6	19.60				
													14.10	21.8						
$MgSO_4.Na_2SO_4.4H_2O + Na_2SO_4.10H_2O$							16.62	17.76	12.30	23.25										
$MgSO_4.3Na_2SO_4$																	14.20	22.25	13.75	20.6
																	13.90	22.40	13.70	20.5
$Na_2SO_4.10H_2O$	11.25	4.69	19.4	7.4	15.70	12.30	10.93	19.17	6.48	26.08										
	9.65	4.89	0.75	8.3	8.92	13.90	3.20	20.69		29.00										
		4.58		8.3		15.05		21.79												
$MgSO_4.Na_2SO_4.4H_2O + MgSO_4.3Na_2SO_4$													13.70	23.80						
$MgSO_4.Na_2SO_4.4H_2O + Na_2SO_4$											11.6	24.50	12.70	25.0						
$Na_2SO_4 + MgSO_4.3Na_2SO_4$																	4.29	28.10		
Na_2SO_4											3.61	30.70	2.60	30.0	9.9	24.8		30.4		29.8
												32.80		31.80	8.8	25.60				
															5.04	28.0				
																31.20				

Solid phases [376]*	Liquid phase [376]			
	t = 25°C		t = 30°C	
	% $MgSO_4$	% Na_2SO_4	% $MgSO_4$	% Na_2SO_4
$MgSO_4.8H_2O$	26.68		26.35	3.96
	25.48	2.73	24.35	8.43
	25.04	3.54	22.89	11.80
	24.49	5.30	22.82	12.56
	23.49	7.50		
	22.32	10.10		
	21.79	11.98		
	21.27	12.76		
$MgSO_4.8H_2O + MgSO_4.7H_2O$			23.0	12.49
$MgSO_4.7H_2O$			22.33	13.71
			21.91	14.47

* Takegami [376] found $MgSO_4.8H_2O$ to be stable at 25°C and up to 40°C in the presence of 7 to 9 % Na_2SO_4. He estimated that $MgSO_4.8H_2O \rightleftarrows MgSO_4.7H_2O$ at 48.2°C, also that $MgSO_4.7H_2O \rightleftarrows MgSO_4.6H_2O$ at 77.2°C. He found that $MgSO_4.8H_2O$ formed $MgSO_4.7H_2O$ when pressed between folds of filter paper He made the above solubility determinations.

Invariant points and miscellaneous data

°C	Solid phases	Liquid phase	
		% $MgSO_4$	% Na_2SO_4
−3.9	$MgSO_4.12H_2O$ + Ice	19.0	
−6	$MgSO_4.7H_2O$ + Ice	19.0m	
−1.2	$MgSO_4.10H_2O$ + Ice		4.0
+1.8	$MgSO_4.12H_2O + MgSO_4.7H_2O$	21.1	
15	$MgSO_4.7H_2O + Na_2SO_4.10H_2O$	21.1	9.1
22*	$MgSO_4.7H_2O + Na_2SO_4.10H_2O + MgSO_4.Na_2SO_4.4H_2O$	20.0	14.9
24.5	$MgSO_4.7H_2O + Na_2SO_4.10H_2O$	19.8m	17.7m
27*	$MgSO_4.Na_2SO_4.4H_2O + Na_2SO_4.10H_2O + Na_2SO_4$	12.5	23.3
32.38*	$Na_2SO_4.10H_2O + Na_2SO_4$		33.6
18.5	$MgSO_4.Na_2SO_4.4H_2O + MgSO_4.7H_2O$	18.3m	17.3m
35	$MgSO_4.Na_2SO_4.4H_2O + MgSO_4.7H_2O$	25.7	8.9
35	$MgSO_4.Na_2SO_4.4H_2O + Na_2SO_4$	12.1	22.3
46*	$MgSO_4.Na_2SO_4.4H_2O + MgSO_4.7H_2O + MgSO_4.6H_2O$	29.4	5.2
48.4	$MgSO_4.7H_2O + MgSO_4.6H_2O$	33.0	
55	$MgSO_4.Na_2SO_4.4H_2O + MgSO_4.6H_2O$	31.7	5.2
55	$MgSO_4.Na_2SO_4.4H_2O + Na_2SO_4$	14.3	22.5
57*	$MgSO_4.Na_2SO_4.4H_2O + Na_2SO_4 + MgSO_4.3Na_2SO_4$	14.3	22.6
61*	$MgSO_4.Na_2SO_4.4H_2O + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O + MgSO_4.6H_2O$	33.1	5.0
64*	$MgSO_4.H_2O + MgSO_4.6H_2O + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O$	34.0	5.3
65	$MgSO_4.H_2O + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O$	34.2	5.2
65	$MgSO_4.Na_2SO_4.\frac{5}{2}H_2O + MgSO_4.Na_2SO_4.4H_2O$	26.8	9.4

SO_4^{--} Mg^{++} Na^+: Invariant points and miscellaneous data.—(*Continued*)

°C	Solid phases	Liquid phase % $MgSO_4$	Liquid phase % Na_2SO_4
65	$MgSO_4.Na_2SO_4.4H_2O + MgSO_4.3Na_2SO_4$	14.6	21.0
65	$MgSO_4.3Na_2SO_4 + Na_2SO_4$	13.4	23.0
68	$MgSO_4.6H_2O + MgSO_4.H_2O$	37.0	
71*	$MgSO_4.3Na_2SO_4. + MgSO_4.Na_2SO_4.4H_2O + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O$	15.5	19.9
75	$MgSO_4.6H_2O + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O$	36.8m	2.8m
75	$MgSO_4.H_2O + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O$	33.5	5.5
75	$MgSO_4.3Na_2SO_4 + Na_2SO_4$	12.8	23.2
80	$MgSO_4.6H_2O + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O$	38.4	2.8
90	$MgSO_4.H_2O + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O$	31.5	6.6
90	$MgSO_4.Na_2SO_4.\frac{5}{2}H_2O + MgSO_4.3Na_2SO_4$	19.6	16.3
90	$MgSO_4.3Na_2SO_4 + Na_2SO_4$	11.5	24.2
100	$MgSO_4.6H_2O$	42.5	
103	$MgSO_4.H_2O + MgSO_4.Na_2SO_4.\frac{5}{2}H_2O$	42.9m	10.31m
103	$MgSO_4.Na_2SO_4.\frac{5}{2}H_2O + Na_2SO_4$	27.92	25.4

* Interpolated.

SO_4^{--} Mg^{++} Na^+ K^+

$H_2O + MgSO_4 + Na_2SO_4 + K_2SO_4$ (97)*; *v.* Figs. 128, 129, 130

	Solid phases; *v.* Fig. 128	Liquid phase—M per 1000M H_2O; figures in parentheses indicate values found by graphical interpolation		
		$t = 0°C$		
		$0.5Na_2SO_4$	$0.5K_2SO_4$	$0.5MgSO_4$
A	$Na_2SO_4.10H_2O$	11.7		
B	$Na_2SO_4.10H_2O + MgSO_4.7H_2O$	14.5		78.6
C	$MgSO_4.7H_2O$			80.5
D	$MgSO_4.7H_2O + MgSO_4.K_2SO_4.6H_2O$		(10)	(84)
E	$MgSO_4.K_2SO_4.6H_2O + K_2SO_4$		18.8	32
F	K_2SO_4		14.9	
G	$K_2SO_4 + Na_2SO_4.10H_2O$	16.0	18.6	
Q	$Na_2SO_4.10H_2O + K_3Na(SO_4)_2 + MgSO_4.K_2SO_4.6H_2O$	10.4	25.5	31.8
R	$K_3Na(SO_4)_2 + MgSO_4.K_2SO_4.6H_2O + K_2SO_4$	15.8	21.0	32.4
S	$MgSO_4.K_2SO_4.6H_2O + Na_2SO_4.10H_2O + MgSO_4.7H_2O$	13.8	10.2	81.0

D'Ans (97) using the work of Meyerhoffer and Saunders (269), shows the field for $K_3Na(SO_4)_2$ extending to the periphery of the diagram (line F-G-A). The work of Blasdale (35) indicates that this field must lie in interior of diagram; the position of P is conjectural.

	v. Fig. 129	$t = 35°C$		
A	Na_2SO_4	125.2		
B	$Na_2SO_4 + Na_2SO_4.MgSO_4.4H_2O$	86.0		55.2
C	$Na_2SO_4.MgSO_4.4H_2O + MgSO_4.7H_2O$	34.6		117.6
D	$MgSO_4.7H_2O$			(130.0)
E	$MgSO_4.7H_2O + MgSO_4.K_2SO_4.6H_2O$		(15.0)	(128.0)
F	$MgSO_4.K_2SO_4.6H_2O + K_2SO_4$		(36.5)	56.0
G	K_2SO_4		28.7	
H	$K_2SO_4 + K_3Na(SO_4)_2$	18.8	30.6	
I	$K_3Na(SO_4)_2 + Na_2SO_4$	117.4	17.8	
P	$Na_2SO_4 + K_3Na(SO_4)_2 + Na_2SO_4.MgSO_4.4H_2O$	99.8	16.6	41.6
Q	$Na_2SO_4.MgSO_4.4H_2O + K_3Na(SO_4)_2 + MgSO_4.K_2SO_4.6H_2O$	65.2	22.6	71.4
R	$K_2SO_4 + MgSO_4.K_2SO_4.6H_2O + K_3Na(SO_4)_2$	15.2	33.2	53.0
S	$MgSO_4.K_2SO_4.6H_2O + Na_2SO_4.MgSO_4.4H_2O + MgSO_4.7H_2O$	46.6	12.4	119.6
		$t = 55°C$		
	Na_2SO_4	117.0		
	$Na_2SO_4 + Na_2SO_4.MgSO_4.4H_2O$	90.2		67.8
	$Na_2SO_4.MgSO_4.4H_2O + MgSO_4.7H_2O$	(21.0)		(150.2)
	$MgSO_4.7H_2O$			(156)
	$MgSO_4.7H_2O + K_2SO_4.MgSO_4.4H_2O$		(16)	(160)
	$K_2SO_4.MgSO_4.4H_2O + K_2SO_4$		47.4	86.2
	K_2SO_4		35.8	
	$K_2SO_4 + K_3Na(SO_4)_2$	(24)	(35)	
	$K_3Na(SO_4)_2 + Na_2SO_4$	(110)	(24)	
	$K_3Na(SO_4)_2 + Na_2SO_4.MgSO_4.4H_2O + Na_2SO_4$	84.4	21.8	61.8
	$K_3Na(SO_4)_2 + Na_2SO_4.MgSO_4.4H_2O + K_2SO_4.MgSO_4.4H_2O$	51.0	23.2	96.4
	$K_2SO_4 + K_3Na(SO_4)_2 + K_2SO_4.MgSO_4.4H_2O$	15.0	40.2	71.2

* Gives much data compiled from other sources. The mineralogical names given to the solid phases here concerned will be found on p. 284.

SO_4^{--} Mg^{++} Na^+ K^+.—(*Continued*)

	Solid phases	Liquid phase—M per 1000M H_2O; figures in parentheses indicate values found by graphical interpolation		
		$0.5Na_2SO_4$	$0.5K_2SO_4$	$0.5MgSO_4$
	v. Fig. 130	t = 90°C		
A	Na_2SO_4	108.7		
B	$Na_2SO_4 + MgSO_4.3Na_2SO_4$	95.0		53.0
C	$MgSO_4.3Na_2SO_4 + Na_2SO_4.MgSO_4.\frac{5}{2}H_2O$	64.4		91.4
D	$Na_2SO_4.MgSO_4.\frac{5}{2}H_2O + MgSO_4.H_2O$	27.2		152.0
E	$MgSO_4.H_2O$			203.0
F	$MgSO_4.H_2O + K_2SO_4.2MgSO_4$		(3)	(186)
G	$K_2SO_4.2MgSO_4 + K_2SO_4$		(54)	(82)
H	K_2SO_4		47.10	
I	$K_2SO_4 + K_3Na(SO_4)_2$	35.2	40	
J	$K_3Na(SO_4)_2 + Na_2SO_4$	107	27.2	
P	$Na_2SO_4 + MgSO_4.3Na_2SO_4 + K_3Na(SO_4)_2$	91.4	29.6	44.2
Q	$MgSO_4.3Na_2SO_4 + K_3Na(SO_4)_2 + Na_2SO_4.MgSO_4.\frac{5}{2}H_2O$	62.2	35.4	89.0
R	$Na_2SO_4.MgSO_4.\frac{5}{2}H_2O + K_2SO_4.2MgSO_4 + K_3Na(SO_4)_2$	55	40.2	104.4
S	$K_2SO_4 + K_2SO_4.2MgSO_4 + K_3Na(SO_4)_2$	29.24	46.6	99.8
T	$Na_2SO_4.MgSO_4.\frac{5}{2}H_2O + K_2SO_4.2MgSO_4 + MgSO_4.H_2O$	18.4	9.8	165

SO_4^{--} Mg^{++} K^+ (97, 170, 203, 206)

$H_2O + MgSO_4 + K_2SO_4$; *v.* Fig. 131

°C	Solid phases	Liquid phase	
		% $MgSO_4$	% K_2SO_4
−5.15	$MgSO_4.12H_2O + K_2SO_4.MgSO_4.6H_2O$ + Ice		
−3.9	$MgSO_4.12H_2O$ + Ice		
−3.0	$K_2SO_4 + K_2SO_4.MgSO_4.6H_2O$ + Ice		
0	K_2SO_4		6.85
0	$K_2SO_4 + K_2SO_4.MgSO_4.6H_2O$	8.93	7.60
+1.8	$MgSO_4.12H_2O + MgSO_4.7H_2O$	23.60	
7	$MgSO_4.12H_2O + MgSO_4.7H_2O + K_2SO_4.MgSO_4.6H_2O$	21.15	3.36
41	$MgSO_4.7H_2O + K_2SO_4.MgSO_4.6H_2O + K_2SO_4.MgSO_4.4H_2O$		
45	$K_2SO_4 + K_2SO_4.MgSO_4.6H_2O$	17.72	14.13
45	$K_2SO_4.MgSO_4.6H_2O + K_2SO_4.MgSO_4.4H_2O$	25.40	7.00
45	$K_2SO_4.MgSO_4.4H_2O + MgSO_4.7H_2O$	31.73	4.68
47.2	$MgSO_4.7H_2O + MgSO_4.6H_2O + K_2SO_4.MgSO_4.4H_2O$		
47.5	$K_2SO_4 + K_2SO_4.MgSO_4.6H_2O + K_2SO_4.MgSO_4.4H_2O$		
48.4	$MgSO_4.7H_2O + MgSO_4.6H_2O$	33.0	
55	$K_2SO_4 + K_2SO_4.MgSO_4.4H_2O$	19.00	15.12
61	$MgSO_4.6H_2O + K_2SO_4.MgSO_4.4H_2O + K_2SO_4.2MgSO_4$		
66.5	$MgSO_4.6H_2O + MgSO_4.H_2O + K_2SO_4.2MgSO_4$		
68	$MgSO_4.6H_2O + MgSO_4.H_2O$	37.00	
70	$MgSO_4.H_2O + K_2SO_4.2MgSO_4$	35.32	3.77
70	$K_2SO_4.MgSO_4.4H_2O + K_2SO_4.2MgSO_4$	32.24	6.10
83	$K_2SO_4 + K_2SO_4.MgSO_4.4H_2O$	18.50	16.13
83	$MgSO_4.H_2O + K_2SO_4.2MgSO_4$	37.10	1.74
83	$K_2SO_4.MgSO_4.4H_2O + K_2SO_4.2MgSO_4$	28.73	7.86
88.5	$K_2SO_4 + K_2SO_4.2MgSO_4$	17.86	17.02
89	$K_2SO_4 + K_2SO_4.MgSO_4.4H_2O + K_2SO_4.2MgSO_4$		
90	$K_2SO_4 + K_2SO_4.MgSO_4.4H_2O$	18.50	16.98

SO_4^{--} Mg^{++} K^+.—(*Continued*)

Solid phases (231, 393)	Liquid phase			
	t = 25°C*		t = 30°C†	
	A‡	B‡	A‡	B‡
K_2SO_4		10.77		11.20
	4.0	11.03	3.45	11.98
	7.8	11.10	9.49	12.64
	10.69	10.84		
	12.06	10.77		
$K_2SO_4 + MgSO_4.K_2SO_4.6H_2O$	12.68	10.70		
$MgSO_4.K_2SO_4.6H_2O$	12.88	10.51	12.88	12.47
	13.26	10.34	13.19	11.66
	14.27	9.63	18.08	8.59
	16.36	8.43	26.05	6.93
	18.76	7.20	26.29	6.60
	24.44	4.70	26.20	5.98
	26.12	4.11	27.69	3.41
$MgSO_4.K_2SO_4.6H_2O + MgSO_4.7H_2O$	26.39	4.02		
$MgSO_4.7H_2O$	26.36	3.76		
	26.57	2.34		
	26.67	1.68		
	26.76		29.03	

* Data from van Klooster, recalculated from M per 1000M of water.

† Data from Weston; his work shows that $MgSO_4.K_2SO_4.6H_2O$ may dissolve $MgSO_4.6H_2O$ and form solid solutions. ‡ A = % $MgSO_4$; B = % K_2SO_4.

SO_4^{--} Ca^{++} (60): $H_2O + H_2SO_4 + CaSO_4$

g H_2SO_4/l	g $CaSO_4$/l	g H_2SO_4/l	g $CaSO_4$/l
$CaSO_4.2H_2O$			
t = 25°		t = 35°C	
0	2.126	48.67	3.397
0.48	2.128	97.35	3.606
4.87	2.144	146.01	3.150
8.11	2.203	t = 43°C	
16.22	2.382	0	2.145
48.67	2.727	0.48	2.236
75.00	2.841	4.87	2.456
97.35	2.779	8.11	2.760
146.01	2.571	16.22	3.116
194.70	2.313	48.67	3.843
243.35	1.901	75.00	4.146
292.02	1.541	146.01	4.139
t = 35°C		194.70	3.551
0.48	2.209	243.35	2.959
4.87	2.451	292.02	2.481

SO_4^{--} Ca^{++}.—(*Cont'd*)

$H_2O + Ca(OH)_2 + CaSO_4$

t = 25°C (56)

g CaO/l	g $CaSO_4$/l
$CaO.H_2O$	
1.166	0
1.141	0.391
1.150	0.666
1.215	0.955
1.242	1.214
1.222	1.588
$CaSO_4.2H_2O$	
0.939	1.634
0.611	1.722
0.349	1.853
0.176	1.918
0.062	2.032
0	2.126

SO_4^{--} Ca^{++} Na^+

$H_2O + CaSO_4 + Na_2SO_4$

t = 22°C (68)

g $CaSO_4$/l	g Na_2SO_4/l
$CaSO_4.2H_2O$	
2.084	0
1.583	2.771
1.433	13.820
1.408	16.360
1.569	39.310
1.841	77.320
2.185	133.000
2.414	193.80
$CaSO_4.2H_2O + Na_2SO_4.10H_2O$	
2.578	222.58

t = 25°C (61, 62)

% $CaSO_4$	% Na_2SO_4
$CaSO_4.2H_2O$	
0.165	0.239
0.145	0.946
0.137	1.397
0.144	2.388
0.152	3.585
0.159	4.441
0.183	8.728
0.191	10.496
0.196	12.830
0.213	17.437
$CaSO_4.2H_2O + Na_2SO_4.10H_2O$	
0.219	21.007

t = 29°C (94)

M per 1000M H_2O

$CaSO_4$	Na_2SO_4
$CaSO_4.2H_2O + Na_2SO_4.CaSO_4 + Na_2SO_4.10H_2O$	
0.35	47.0

t = 60°C (94)

$CaSO_4.2H_2O + Na_2SO_4.CaSO_4$*	
0.604	31.2

* A second labile calcium sodium sulfate has been found by several investigators. van't Hoff (188) found the transition temperature for $CaSO_4.2H_2O + Na_2SO_4.10H_2O$ + labile sulfate to be 30.2°C; he, and also Cameron and Seidell (68), assigned to it the formula $CaSO_4.Na_2SO_4.2H_2O$, but D'Ans found $CaSO_4.2Na_2SO_4.2H_2O$.

SO_4^{--} Ca^{++} Na^+

$H_2O + Ca(OH)_2 + Na_2SO_4$

t = 25°C (98)

M per 1000g soln.

Na_2SO_4	NaOH
$Na_2SO_4.10H_2O + CaSO_4.2H_2O$	
1.54 *ca.*	0.0
$Na_2SO_4.10H_2O + CaSO_4.2H_2O + Ca(OH)_2$	
1.41	2.96

SO_4^{--} Ca^{++} K^+

$H_2O + CaSO_4 + K_2SO_4$ (4, 5, 94, 205, 207)

v. Fig. 132

°C	% K_2SO_4	% $CaSO_4$
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$		
0	2.07	
25	3.04	
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O + 5CaSO_4.K_2SO_4.H_2O$		
31.8	3.49	
$CaSO_4.K_2SO_4.H_2O + 5CaSO_4.K_2SO_4.H_2O$		
40	4.01	
60	6.10	
83	8.72	
100	8.21	0.10
$CaSO_4.2H_2O + 5CaSO_4.K_2SO_4.H_2O$		
40	3.56	
60	2.27	
83	1.22	
100	1.05	0.24

t = 25°C (61)

% $CaSO_4$	% K_2SO_4
$CaSO_4.2H_2O$	
0.156	0.508
0.144	0.978
0.146	1.928
0.152	2.772
0.155	2.995
0.151	3.041
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$	
0.154	3.167
$CaSO_4.K_2SO_4.H_2O$	
0.122	3.426
0.118	3.483
0.094	3.932
0.078	4.532
0.042	7.131
0.030	10.394

SO_4^{--} Ca^{++} K^+

$H_2O + H_2SO_4 + CaSO_4 + K_2SO_4$

t = 25°C (94)

M per 1000M H_2O

H_2SO_4	K_2SO_4	$CaSO_4$
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$		
0.394	3.22	0.205
1.946	3.58	0.252

SO_4^{--} Ca^{++} K^+.—(*Continued*)

M per 1000M H_2O

H_2SO_4	K_2SO_4	$CaSO_4$
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O$		
19.470	6.73	0.489
33.590	8.74	0.360
72.450	14.79	0.309
$CaSO_4.2H_2O + CaSO_4.K_2SO_4.H_2O + KHSO_4$		
87.84	19.04	0.275

SO_4^{--} Ca^{++} K^+ (174)

$H_2O + Ca(OH)_2 + K_2SO_4$

°C	M_{OH^-}/l	$M_{SO_4^{--}}$/l
$CaSO_4.2H_2O + Ca(OH)_2 + CaSO_4.K_2SO_4.H_2O$		
0	0.125	0.123
20	0.118	0.152
70	0.074	0.225
150	0.094	0.320

t = 25°C (98)

M per 100g soln.

K_2SO_4	KOH
$Ca(OH)_2 + K_2SO_4 + K_2SO_4.CaSO_4.H_2O$	
0.433	0.515
$Ca(OH)_2 + CaSO_4.2H_2O + K_2SO_4.CaSO_4.H_2O$	
0.158	0.114

SO_4^{--} Ca^{++} Cs^+ (94)

$H_2O + CaSO_4 + Cs_2SO_4$

t = 25°C	t = 60°C
M per 1000M H_2O	
SO_3	SO_3
$CaSO_4.2H_2O + 2CaSO_4.Cs_2SO_4$	
14	12.4

SO_4^{--} Ra^{++}

$H_2O + H_2SO_4 + RaSO_4$

t = 25°C (246)

% H_2SO_4	g $RaSO_4$/l
$RaSO_4$	
0.0	0.000021
0.049	0.0000205
0.489	0.000022
4.74	0.000022
10	0.000024
15	0.000024
25	0.000023
30	0.000023
45	0.000019
50	0.000021
55	0.000034
60	0.000063
65	0.000064

SO_4^{--} Ca^{++} Rb^+ (94)

$H_2O + CaSO_4 + Rb_2SO_4$; *v.* Fig. 133

Solid phases	Liquid phase—M per 1000M H_2O °C	SO_3
$CaSO_4.2H_2O + CaSO_4.Rb_2SO_4.H_2O$	0	16.9
$CaSO_4.2H_2O + 2CaSO_4.Rb_2SO_4$	25	18.79
$CaSO_4.Rb_2SO_4.H_2O + 2CaSO_4.Rb_2SO_4$	25	26.02*
$CaSO_4.Rb_2SO_4.H_2O + 2CaSO_4.Rb_2SO_4$	40	39.50
$CaSO_4.2H_2O + 2CaSO_4.Rb_2SO_4$	50	13.10

* Composed of 25.52 Rb_2SO_4 and 0.5 $CaSO_4$.

SO_4^{--} Li^+

$H_2O + H_2SO_4 + Li_2SO_4$

t = 30°C (107); *v.* Fig. 134

	Solid phases	Liquid phase % H_2SO_4	% Li_2SO_4
A			25.10
B		5.05	22.74
C	$Li_2SO_4.H_2O$	16.60	19.10
D		32.7	13.37
E		48.0	10.20
F	$Li_2SO_4.H_2O + Li_2SO_4$	55.00	13.00
G	Li_2SO_4	56.30	13.87
H	$Li_2SO_4 + Li_2SO_4.H_2SO_4$	62.40	18.50
I		69.40	13.75
J	$Li_2SO_4.H_2SO_4$	78.23	11.64
K		83.43	15.65

SO_4^{--} Na^+: $H_2O + H_2SO_4 + NaOH$

t = 25°C ([96]); *v.* Fig. 135

	Solid phases	Liquid phase—M per 1000g soln. SO_3	Liquid phase—M per 1000g soln. Na_2O
A	$NaHS_2O_7$(?)	10.78	0.302
		9.98	0.908
B		9.85	0.787
C		9.48	0.953
	$NaHS_2O_7$	9.55	0.775
D		9.18	0.567
E	$Na_2SO_4.\frac{8}{5}H_2SO_4 + NaHS_2O_7$	9.36	0.425
F	$Na_2SO_4.\frac{8}{5}H_2SO_4$	9.08	0.394
G	$NaH_3(SO_4)_2.H_2O + Na_2SO_4.\frac{8}{5}H_2SO_4$	8.87	0.445
	$NaH_3(SO_4)_2.H_2O$	8.86	0.156
H		8.70	0.076
		8.61	0.899
		8.12	0.037
I		7.36	0.071
J	$NaHSO_4 + NaH_3(SO_4)_2.H_2O$	6.64	0.297
K	$NaHSO_4$	5.91	0.409

t = 25°C ([98])

M per 1000g soln.

NaOH	Na_2SO_4	NaOH	Na_2SO_4
$Na_2SO_4.10H_2O$		Na_2SO_4	
0.0	1.54*	4.04	0.59
0.148	1.41	5.64	0.24
1.400	1.08	7.04	0.126
		11.66	0.013
$Na_2SO_4.10H_2O + Na_2SO_4$		$NaOH.H_2O$	
2.94	0.90	13.24*	0.0

* Work of other investigators.

Solid phases ([135])	Liquid phase† t = 12°C % A‡	t = 12°C % B‡	t = 25°C % A‡	t = 25°C % B‡
$Na_2SO_4.10H_2O$		9.48*		21.90
$Na_2SO_4.10H_2O + Na_3H(SO_4)_2$	16.52*	32.93*		
$Na_2SO_4.10H_2O + Na_2SO_4$			8.62*	34.48*
$Na_3H(SO_4)_2 + NaHSO_4.H_2O$	27.96*	25.42*	30.58*	27.02*
$Na_3H(SO_4)_2 + Na_2SO_4$			16.27*	35.37*
$NaHSO_4.H_2O$	58.79	4.33	56.25	6.54

* Mean of two results. † For discussion of practical use of these data, *v.* ([322]). ‡ A = H_2SO_4; B = Na_2SO_4.

SO_4^{--} Na^+ K^+ ([35, 97, 190, 269]): $H_2O + Na_2SO_4 + K_2SO_4$

Solid phases*	t = 0°C % K_2SO_4	t = 0°C % Na_2SO_4	t = 25°C % K_2SO_4	t = 25°C % Na_2SO_4	t = 35°C % K_2SO_4	t = 35°C % Na_2SO_4	t = 50°C % K_2SO_4	t = 50°C % Na_2SO_4	t = 60°C % K_2SO_4	t = 60°C % Na_2SO_4	t = 75°C % K_2SO_4	t = 75°C % Na_2SO_4	t = 90°C % K_2SO_4	t = 90°C % Na_2SO_4	t = 100°C % K_2SO_4	t = 100°C % Na_2SO_4
K_2SO_4	6.74		10.73				14.59				17.22				18.98	
$K_2SO_4 + K_3Na(SO_4)_2$			11.04	5.58	6.07	12.11	13.98	5.47	14.13	6.51	14.45	7.84	14.57	10.42	15.29	10.12
$K_3Na(SO_4)_2 + Na_2SO_4.10H_2O$			6.63	22.08												
$K_3Na(SO_4)_2 + Na_2SO_4$					5.55	29.90	6.06	29.47	8.12	27.35	7.65	27.34	8.47	27.17	8.77	26.84
$K_2SO_4 + Na_2SO_4.10H_2O$	7.80	5.46														
$Na_2SO_4.10H_2O$		4.50		21.83												
Na_2SO_4								30.96				30.27				29.42

Invariant point: $Na_2SO_4.10H_2O + Na_2SO_4 + K_3Na(SO_4)_2$ at 30.1°C.

* Osaka ([287]) determined the composition of the double salt in equilibrium with solutions of varying composition at 15, 25, 40, 50, 60, 70 and 80°C. The results show that $K_3Na(SO_4)_2$ dissolves Na_2SO_4 to a slight extent, but not K_2SO_4. This is in accord with the work of van't Hoff and Barschall ([190]) and other investigators.

SO_4^{--} Na^+ Cs^+; *v.* p. 355

SO_4^{--} K^+: $H_2O + H_2SO_4 + K_2O$

Solid phases t = 25°C ([96]); *v.* Fig. 136

	Solid phases	Liquid phase—M per 1000g soln. SO_3	Liquid phase—M per 1000g soln. K_2O
A	KHS_2O_7	9.66	0.937
		9.80	0.665
B	$KH_3(SO_4)_2 + KHS_2O_7$	8.65	0.880
C	$KH_3(SO_4)_2$	8.57	0.384
		8.45	0.325
D	$KH_3(SO_4)_2.H_2O + KH_3(SO_4)_2$	8.16	0.364
E	$KH_3(SO_4)_2.H_2O$	8.15	0.352
		7.88	0.167
		7.26	0.182
F	$KHSO_4 + KH_3(SO_4)_2.H_2O$	6.91	0.266
G	$KHSO_4$	6.40	0.171

Solid phases t = 18°C ([369]); *v.* Fig. 137

	Solid phases	Liquid phase % K_2SO_4	Liquid phase % H_2SO_4
A	K_2SO_4	9.72	0
B		13.04	4.38
C		18.04	11.01
		19.29	12.51
E	$3K_2SO_4.H_2SO_4$	18.95	14.50
F		18.62	18.80
	$5K_2SO_4.3H_2SO_4$	18.06	21.02
	$8K_2SO_4.6H_2SO_4$	17.07	20.95
I	$8K_2SO_4.6H_2SO_4 + K_2SO_4.H_2SO_4$	14.81	22.93
J	$K_2SO_4.H_2SO_4$	10.40	26.52
K		7.23	29.90
L		5.05	33.95
		2.08	60.37

SO_4^{--} K^+.—(*Continued*)

M per 1000g soln.; t = 25°C ([98])

KOH	K_2SO_4	KOH	K_2SO_4
K_2SO_4		K_2SO_4	
0.0	0.617*	5.72	0.035
0.516	0.433	6.84	0.009
0.866	0.280	$KOH.2H_2O$	
2.260	0.137	9.618*	0.0

* Work of other investigators.

SO_4^{--} Na^+ Cs^+: $H_2O + Na_2SO_4 + Cs_2SO_4$; t = 25°C ([132])

% Cs_2SO_4	% Na_2SO_4	Solid phases
54.7	11.45	$Cs_2SO_4 + Na_2SO_4$

HSO_4^- $HTeO_4^-$ Rb^+: $H_2O + RbHSO_4 + RbHTeO_4$

Solid phase M % $RbHSO_4$*	Liquid phase—t = 25°C ([298]) g $RbHSO_4$/l	g $RbHTeO_4$/l
47.91	26.675	38.403
50.33	32.117	31.580
50.74	42.917	26.764
50.99	59.074	20.182
52.52	498.25	0.02887

* Solid soln.

$S_2O_3^{--}$ NO_3^- Na^+ ([237]): $H_2O + Na_2S_2O_3 + NaNO_3$

Solid phases	Liquid phase t = 9°C % $NaNO_3$	% $Na_2S_2O_3$	t = 25°C % $NaNO_3$	% $Na_2S_2O_3$
$NaNO_3$	44.60		47.90	
$NaNO_3 + Na_2S_2O_3.5H_2O$	22.58	23.41	20.40	31.95
$Na_2S_2O_3.5H_2O$		37.89		43.51

$S_2O_3^{--}$ NO_3^- Ca^{++} ([237]): $H_2O + CaS_2O_3 + Ca(NO_3)_2$

Solid phases	Liquid phase t = 9°C % CaS_2O_3	% $Ca(NO_3)_2$	t = 25°C % CaS_2O_3	% $Ca(NO_3)_2$
$CaS_2O_3.6H_2O$	29.34		34.68	
$CaS_2O_3.6H_2O + Ca(NO_3)_2.4H_2O$	6.81	45.68	13.00	45.92
$Ca(NO_3)_2.4H_2O$		51.53		58.64

$S_2O_3^{--}$ Pb^{++} Sr^{++}

$H_2O + PbS_2O_3 + SrS_2O_3$

t = 25°C ([129])

Solid phase—M % $PbS_2O_3.4H_2O$	$SrS_2O_3.4H_2O$	Liquid phase—M per l PbS_2O_3	SrS_2O_3
0.00	100.00	0.00	0.5881
0.30	99.70	0.008	0.6105
3.87	96.13	0.1112	0.6155
9.84	90.16	0.4062	0.4623
19.26	80.74	0.6977	0.3433
23.73	76.27	0.8453	0.2705
32.24	67.76	1.0185	0.2858
49.97	50.13	1.388	0.1841
100.00	0.0	1.0198	0.00

$S_2O_3^{--}$ NO_3^- Ca^{++} Na^+ ([237]): $H_2O + Ca(NO_3)_2 + Na_2S_2O_3$; *v.* Fig. 138

	Solid phases	Liquid phase—M per 1000M H_2O, t = 9°C; *v.* Fig. 138: $NaNO_3$	0.5$Ca(NO_3)_2$	0.5$Na_2S_2O_3$	0.5CaS_2O_3	t = 25°C: $NaNO_3$	0.5$Ca(NO_3)_2$	0.5$Na_2S_2O_3$	0.5CaS_2O_3
A	$CaS_2O_3.6H_2O$				98.3				125.7
B	$CaS_2O_3.6H_2O + Ca(NO_3)_2.4H_2O$		224.9		26.9		245.5		74.7
C	$Ca(NO_3)_2.4H_2O$		233.5				311.1		
D	$Ca(NO_3)_2.4H_2O + NaNO_3$	63.49	241.2			72.7	328.8		
E	$NaNO_3$	170.6				194.7			
F	$NaNO_3 + Na_2S_2O_3.5H_2O$	86.62		98.7		98.8		153.0	
G	$Na_2S_2O_3.5H_2O$			139.10				175.4	
H	$CaS_2O_3.6H_2O + Na_2S_2O_3.5H_2O$			97.4	63.6			139.03	97.3
P	$CaS_2O_3.6H_2O + Na_2S_2O_3.5H_2O + Na_2S_2O_3.CaS_2O_3.NaNO_3.11H_2O$	20.7		91.4	70.2	33.2		135.3	111.3
Q	$Na_2S_2O_3.5H_2O + NaNO_3 + Na_2S_2O_3.CaS_2O_3.NaNO_3.11H_2O$	96.2		82.2	30.4	75.16		131.5	70.48
R	$NaNO_3 + CaS_2O_3.6H_2O + Na_2S_2O_3.CaS_2O_3.NaNO_3.11H_2O$	123.1	39.2		76.3	108.0		61.3	112.2
S	$Ca(NO_3)_2.4H_2O + CaS_2O_3.6H_2O + NaNO_3$	62.6	224.9		46.40	79.1	263.6		81.8

$S_2O_3^{--}$ Ca^{++} Na^+ ([237]): $H_2O + CaS_2O_3 + Na_2S_2O_3$

Solid phases	Liquid phase t = 9°C % CaS_2O_3	% $Na_2S_2O_3$	t = 25°C % CaS_2O_3	% $Na_2S_2O_3$
$CaS_2O_3.6H_2O$	29.34		34.68	
$CaS_2O_3.6H_2O + Na_2S_2O_3.5H_2O$	15.84	25.21	20.33	30.19
$Na_2S_2O_3.5H_2O$		37.89		43.51

$S_2O_6^{--}$ NH_4^+ Cu^{++}: $H_2O + (NH_4)_2S_2O_6 + CuS_2O_6$

t = 30°C ([15])

% $(NH_4)_2S_2O_6$	% CuS_2O_6	% $(NH_4)_2S_2O_6$	% CuS_2O_6
$(NH_4)_2S_2O_6.\frac{1}{2}H_2O$		$(NH_4)_2S_2O_6.2CuS_2O_6.8H_2O + CuS_2O_6.4H_2O$	
64.6	0.0	18.39	36.19
52.62	10.45	$CuS_2O_6.4H_2O$	
$(NH_4)_2S_2O_6.\frac{1}{2}H_2O + (NH_4)_2S_2O_6.2CuS_2O_6.8H_2O$		16.16	37.26
38.30	24.17	8.91	41.06
$(NH_4)_2S_2O_6.2CuS_2O_6.8H_2O$		0.0	45.51
29.28	29.70		
18.50	36.04		

$S_2O_6^{--}$ Ba^{++} Na^+ (15): $H_2O + BaS_2O_6 + Na_2S_2O_6$

Solid phases	Liquid phase							
	t = 0°C		t = 12°C		t = 20°C		t = 30°C	
	% BaS_2O_6	% $Na_2S_2O_6$	% BaS_2O_6	% $Na_2S_2O_6$	% BaS_2O_6	% $Na_2S_2O_6$	% BaS_2O_6	% $Na_2S_2O_6$
$BaS_2O_6.2H_2O$	7.86	0.0	12.45	0.0	15.75	0.0	19.76	0.0
	7.45	2.74	11.05	6.95	13.81	6.63	17.06	6.36
$BaS_2O_6.2H_2O + Na_2S_2O_6.2H_2O$	5.86	6.23	10.76	9.27	12.66	11.02	14.46*	13.10*
$Na_2S_2O_6.2H_2O$	2.51	6.94	7.57	9.82	7.45	12.12	13.23	13.31
	0.0	6.05	0.0	10.63	0.0	13.39	7.32	14.87
							0.0	17.32

* Average of four results.

$S_2O_6^{--}$ NH_4^+ Sr^{++}

$H_2O + (NH_4)_2S_2O_6 + SrS_2O_6$

t = 30°C (15)

% $(NH_4)_2S_2O_6$	% SrS_2O_6
$SrS_2O_6.4H_2O$	
0.0	14.90
16.55	10.73
24.52	8.79
34.57	6.47
45.04	4.45
49.54	3.75
56.51	2.77
56.76	2.71
$SrS_2O_6.4H_2O + (NH_4)_2S_2O_6.\frac{1}{2}H_2O$	
60.66	2.17
$(NH_4)_2S_2O_6.\frac{1}{2}H_2O$	
63.73	0.98
64.60	0.0

$S_2O_6^{--}$ NH_4^+ Ba^{++}

$H_2O + (NH_4)_2S_2O_6 + BaS_2O_6$

t = 30°C (15)

% BaS_2O_6	% $(NH_4)_2S_2O_6$
$BaS_2O_6.2H_2O$	
19.76	0.0
17.20	11.00
11.21	33.62
10.26	37.26
8.31	37.90
6.92	40.15
5.28	43.22
2.75	48.45
1.14	53.66

$S_2O_6^{--}$ NH_4^+ Ba^{++}.—(*Cont'd*)

% BaS_2O_6	% $(NH_4)_2S_2O_6$
$BaS_2O_6.2H_2O$	
1.05	53.81
0.62	56.26
0.35	58.64
$(NH_4)_2S_2O_6.\frac{1}{2}H_2O$	
0.0	64.60

$S_2O_6^{--}$ Mg^{++} Ba^{++} (15)

$H_2O + MgS_2O_6 + BaS_2O_6$

t = 20°C		t = 30°C	
% BaS_2O_6	% MgS_2O_6	% BaS_2O_6	% MgS_2O_6
$BaS_2O_6.2H_2O$			
15.75	0.0	19.86	0.0
10.61	6.93	13.37	7.05
1.29	31.14	5.85	18.91
		1.92	29.16
$BaS_2O_6.2H_2O + MgS_2O_6.6H_2O$			
0.69	33.95	0.90	34.57
$MgS_2O_6.6H_2O$			
0.0	33.91	0.0	35.24

$S_2O_6^{--}$ Sr^{++} Na^+

$H_2O + SrS_2O_6 + Na_2S_2O_6$

t = 30°C (15)

% $Na_2S_2O_6$	% SrS_2O_6
$SrS_2O_6.4H_2O$	
0.0	14.90
6.91	12.24
$SrS_2O_6.4H_2O + Na_2S_2O_6.2H_2O$	
13.06	10.09
$Na_2S_2O_6.2H_2O$	
14.52	5.55
17.32	0.0

$S_2O_6^{--}$ Ba^{++} K^+ (15): $H_2O + BaS_2O_6 + K_2S_2O_6$

Solid phases	Liquid phase					
	t = 0°C		t = 20°C		t = 30°C	
	% BaS_2O_6	% $K_2S_2O_6$	% BaS_2O_6	% $K_2S_2O_6$	% BaS_2O_6	% $K_2S_2O_6$
$BaS_2O_6.2H_2O$	7.86	0.0	15.75	0.0	19.86	0.0
	8.02	1.21	16.43	2.69	20.64	4.16
$BaS_2O_6.2H_2O + K_2S_2O_6$	8.88	2.75	17.15	6.03	20.69	8.03
$K_2S_2O_6$	4.69	2.60	11.82	6.02	20.50	8.11
	0.0	2.52	0.0	6.23	11.74	8.33
					6.02	8.49
					0.0	8.54

SeO_3^{--} Hg^{++} Na^+

$H_2O + HgSeO_3 + Na_2SeO_3$

t = 25°C (317)

$M_{Na_2SeO_3}$/l	M_{HgSeO_3}/l
$HgSeO_3$*	
2.0	0.0835
1.0	0.0425
0.5	0.0214
0.25	0.0161
0.125	0.0097
0.0625	0.0055

* Assuming that the complex $Hg(SeO_3)_2$ is formed, the writers calculate that $Hg(SeO_3)_2 \div (SeO_3)$ gives a constant for the first three concentrations of Na_2SeO_3 given in the table.

SeO_4^{--} CrO_4^{--}

$H_2O + H_2SeO_4 + H_2CrO_4$

t = 23°C (264)

% H_2SeO_4	% CrO_3
CrO_3	
50.33	8.65
81.07	0.16
87.64	0.29
96.03	0.17
98.15	0.35

SeO_4^{--} Be^{++} (= Gl^{++})

$H_2O + BeO + BeSeO_4$

t = 25°C (362.5)

Gives data for solubility of $BeSeO_4.4H_2O$ in solutions containing varying concentrations of BeO.

$HSeO_4^-$ $HTeO_4^-$ Rb^+

$H_2O + RbHSeO_4 + RbHTeO_4$

t = 25°C (298)

Solid phase—solid soln. M% $RbHSeO_4$	Liquid phase	
	g $RbHSeO_4$/l	g $RbHTeO_4$/l
51.55	76.46	39.505
52.22	95.82	35.300
53.95	171.70	22.98
56.33	462.80	5.00
67.46	859.30	3.40

N_3^- NO_3^- Pb^{++} Na^+ (227)

$H_2O + Pb(N_3)_2 + NaNO_3$

°C	g $Pb(N_3)_2$/l	g $NaNO_3$/l
	$Pb(N_3)_2$	
18	0.232	0.0
18	0.247	340.0
70	0.9012	0.0
70	4.87	340.0

N_3^- $C_2H_3O_2^-$ Pb^{++} Na^+ (227)

$H_2O + Pb(N_3)_2 + NaC_2H_3O_2$

°C	g $Pb(N_3)_2$/l	g $NaC_2H_3O_2$/l
	$Pb(N_3)_2$	
18	0.232	0.0
18	15.42	328.0
80	20.20	328.0

NO_2^- Ag^+ Ca^{++}

$H_2O + AgNO_2 + Ca(NO_2)_2$

t = 14°C (293); *v.* Fig. 139

g per 100g H_2O*

$Ca(NO_2)_2$	$AgNO_2$
$Ca(NO_2)_2 + AgNO_2$	
92.4	11.2

* Author does not give further numerical data but a number of points on a diagram (Fig. 139).

NO_2^- Ag^+ Sr^{++}

$H_2O + AgNO_2 + Sr(NO_2)_2$

t = 14°C (293); *v.* Fig. 140

g per 100g H_2O*

$AgNO_2$	$Sr(NO_2)_2$
$Sr(NO_2)_2 + AgNO_2$	
10.9	78.3

* Author does not give further numerical data, but a number of additional points on a diagram (Fig. 140).

NO_2^- NO_3^- Na^+ (293): $H_2O + NaNO_2 + NaNO_3$

Solid phases	Liquid phase—g per 100g H_2O													
	t = 0°C		t = 21°C		t = 52°C		t = 65°C		t = 81°C		t = 92°C		t = 103°C	
	$NaNO_3$	$NaNO_2$	$NaNO_3$	$NaNO_2$	$NaNO_3$	$NaNO_2$	$NaNO_3$	$NaNO_2$	$NaNO_3$	$NaNO_2$	$NaNO_3$	$NaNO_2$	$NaNO_3$	N_2NO_2
$NaNO_2$	0.0	73.0	0.0	84.75	0.0	108.8	0.0	120.7	0.0	137.1	0.0	149.7	0.0	166.0
	19.0	68.5	9.6	81.1	6.7	107.9	34.8	111.5	38.8	125.7	23.6	141.2	33.2	153.3
	36.3	67.1	23.5	79.7	20.6	104.3	62.8	108.5	69.8	122.7	57.6	134.6	58.8	148.8
			50.8	73.8	34.5	101.8								
					43.2	99.5								
					62.6	98.0								
$NaNO_2 + NaNO_3$	41.7	64.9	54.5	73.1	82.0	97.8	90.6	107.8	101.0	122.6	107.8	132.3	116.0	142.4
$NaNO_3$	46.8	50.3	56.7	64.2	88.0	65.2	96.0	78.3	111.5	79.1	130.6	60.2	126.8	100.0
	55.4	30.2	62.8	46.8	92.9	44.2	104.1	49.5	121.0	50.0	145.0	30.3	142.9	60.1
	74.2	0.0	74.7	21.6	101.4	27.2	113.4	28.4	131.7	27.2	163.5	0.0	181.2	0.0
			89.3	0.0	109.0	14.7	121.4	14.7	150.0	0.0				
					118.0	0.0	131.0	0.0						

NO_2^- Ag^+ Ba^{++}
$H_2O + AgNO_2 + Ba(NO_2)_2$
t = 13.5° C(293)
v. Fig. 141

g per 100g H_2O*	
$Ba(NO_2)_2$	$AgNO_2$
$AgNO_2 + 2AgNO_2.Ba(NO_2)_2.H_2O$	
64.0	10.2
$2AgNO_2.Ba(NO_2)_2.H_2O + Ba(NO_2)_2$	
75.6	9.5

* Author does not give further numerical data but a number of points on a diagram (Fig. 141).

NO_2^- Ag^+ Li^+
$H_2O + AgNO_2 + LiNO_2$
t = 14°C (293)
v. Fig. 142

g per 100g H_2O*	
$LiNO_2$	$AgNO_2$
$LiNO_2 + AgNO_2$	
78.5	10.5

* Author does not give further numerical data but a number of points on a diagram (Fig. 142).

NO_2^- Ag^+ K^+.—(*Continued*)
t = 25°C (91)

M_{KNO_2}/l	M_{AgNO_2}/l
$AgNO_2$	
0.000	0.0269
0.00258	0.0259
0.00588	0.0249
0.01177	0.0232
0.02355	0.0203
0.04710	0.0181

NO_3^- NH_4^+.—(*Continued*)
t = 20°C (278)

% NH_4NO_3	% HNO_3
NH_4NO_3	
65.64	0.0
60.04	3.98
55.95	8.81
51.17	14.65
46.35	21.46
43.35	28.33

* Melting point.

NO_3^- NH_4^+ (154)
$H_2O + HNO_3 + NH_4NO_3$

°C	% NH_4NO_3	% HNO_3
$NH_4NO_3.2HNO_3$		
−8	34.2	53.9
−2.5	34.8	54.8
+3.0	35.4	55.8
8.5	36.0	56.8
19.5	37.4	58.9
25.0	38.1	60.0
29.5*	38.8	61.2

NO_3^- NH_4^+ $C_2O_4^{--}$ (82)
$H_2O + NH_4NO_3 + (NH_4)_2C_2O_4$

°C	% NH_4NO_3	% $(NH_4)_2C_2O_4$
$NH_4NO_3 + (NH_4)_2C_2O_4.H_2O$		
19	62.26	0.085
50	72.11	0.35

NO_2^- Ag^+ Na^+ (293)
$H_2O + AgNO_2 + NaNO_2$; *v.* Fig. 143

Solid phases	Liquid phase—g per 100g H_2O*			
	t = 14°C		t = 22°C	
	$NaNO_2$	$AgNO_2$	$NaNO_2$	$AgNO_2$
$AgNO_2 + 2AgNO_2.2NaNO_2.H_2O$	55.0	15.2	58.3	21.5
$2AgNO_2.2NaNO_2.H_2O + NaNO_2$	74.5	11.3	78.3	13.4

* Author does not give further numerical data but several additional points on a diagram (Fig. 143).

NO_2^- Ag^+ K^+ (293)
$H_2O + AgNO_2 + KNO_2$; *v.* Fig. 144

Solid phases	Liquid phase—g per 100g H_2O*			
	t = 13.5°C		t = 25°C	
	KNO_2	$AgNO_2$	KNO_2	$AgNO_2$
$AgNO_2 + 2AgNO_2.2KNO_2.H_2O$	18.0	2.36	23.1	5.3
$2AgNO_2.2KNO_2.H_2O + KNO_2$	276.0	26.3	279.0	39.3

* Author does not give further numerical data but a number of points on a diagram (Fig. 144).

NO_3^- NH_4^+ HCO_3^- (125)
$H_2O + NH_4NO_3 + NH_4HCO_3$

Solid phases	Liquid phase—g per 1000g H_2O					
	t = 0°C		t = 15°C		t = 30°C	
	NH_4NO_3	NH_4HCO_3	NH_4NO_3	NH_4HCO_3	NH_4NO_3	NH_4HCO_3
NH_4HCO_3	0	119		186.4	0	269.6
			232.6	129.10		
			498.20	103.30		
			1034	82.50		
			1189	77.9		
$NH_4HCO_3 + NH_4NO_3$	1180	45.20	1669	74.6	2319	125.70

NO_3^- NH_4^+ Ag^+ (348): $H_2O + NH_4NO_3 + AgNO_3$

°C	Solid phases	Liquid phase	
		% NH_4NO_3	% $AgNO_3$
30	NH_4NO_3	70.1	0
		63.59	12.51
		58.64	21.37

Continued on p. 358

NO_3^- NH_4^+ HCO_3^- Na^+ (125): $H_2O + NH_4HCO_3 + NaNO_3$; *v.* Fig. 145

	Solid phases	Liquid phase—M per 1000M H_2O											
		t = 0°C				t = 15°C				t = 30°C			
		$NaHCO_3$	NH_4NO_3	$NaNO_3$	NH_4HCO_3	$NaHCO_3$	NH_4NO_3	$NaNO_3$	NH_4HCO_3	$NaHCO_3$	NH_4NO_3	$NaNO_3$	NH_4HCO_3
A	$NaHCO_3$	14.94				18.9				23.60			
B	$NaHCO_3 + NaNO_3$	3.06		153.9		3.42		176		3.78		201.4	
C	$NaNO_3$			155.2				177.5				203.4	
D	$NaNO_3 + NH_4NO_3$		237.24	138.6			349.3	159.48			496.4	186.8	
E	NH_4NO_3		266.2				376.4				523.1		
F	$NH_4NO_3 + NH_4HCO_3$		265.3		10.26		375.3		16.9		521.5		28.6
G	NH_4HCO_3				27.00				42.5				61.38
H	$NH_4HCO_3 + NaHCO_3$	10.44			25.00	12.8			38.9	15.5			58.14
L	$NH_4NO_3 + NH_4HCO_3 + NaHCO_3$	11.70	256.3	52.94		19.26	376.9	51.5		34.6	538.9	45.2	
M	$NH_4NO_3 + NaNO_3 + NaHCO_3$	4.68	237.6	134.3		7.2	352.3	153.7		11.9	505.3	173.7	

NO_3^- NH_4^+ Ag^+.—(*Continued from p. 357*)

°C	Solid phases	Liquid phase % NH_4NO_3	Liquid phase % $AgNO_3$
30	$NH_4NO_3 + NH_4NO_3.AgNO_3$	52.50	29.76
	$NH_4NO_3.AgNO_3$	45.44	35.62
		39.60	41.09
		34.47	45.85
		28.86	52.45
		24.33	57.93
	$NH_4NO_3.AgNO_3 + AgNO_3$	23.43	58.89
	$AgNO_3$	15.62	63.27
		6.59	69.08
		0	73.00
− 7.3	Ice + $AgNO_3$*	0	47.10
− 10.7	$AgNO_3$*	8.43	44.52
− 14.9	Ice + $NH_4NO_3.AgNO_3$ + $AgNO_3$*	16.80	42.00
− 14.8	Ice + $NH_4NO_3.AgNO_3$	18.79	39.51
− 18.7	Ice + $NH_4NO_3.AgNO_3$ + $NH_4NO_3\beta$	37.30	15.99
− 17.4	Ice + NH_4NO_3	41.20	0
0	$NH_4NO_3.AgNO_3 + AgNO_3$*	19.59	50.36
+ 18		22.06	55.36
55		26.12	63.32
109.6		32.10	67.90
0	$NH_4NO_3.AgNO_3 + NH_4NO_3\beta$	44.87	22.13
18		49.22	26.07
40	$NH_4NO_3.AgNO_3 + NH_4NO_3\alpha$	52.22	32.68
55		52.38	36.60
101.5	$NH_4NO_3.AgNO_3 + NH_4NO_3$†	52.50	47.50

* Rhombic. † Rhombohedral.

NO_3^- NH_4^+ Cu^{++}: $H_2O + NH_4NO_3 + Cu(NO_3)_2$
t = 30.5°C (262)

% $Cu(NO_3)_2$	% NH_4NO_3	% $Cu(NO_3)_2$	% NH_4NO_3
$Cu(NO_3)_2.3H_2O$		NH_4NO_3	
60.2	0.0	37.5	38.3
59.7	1.6	34.9	40.4
58.9	3.9	31.7	41.0
55.1	11.5	29.2	42.2
52.4	19.0	20.8	49.3
49.9	25.2	6.5	62.8
$Cu(NO_3)_2.3H_2O + NH_4NO_3$		0.0	70.6
46.0	36.4		

NO_3^- NH_4^+ Cu^{++}.—(*Continued*)

Solid phases (356)	t = 30°C % $Cu(NO_3)_2$	t = 30°C % NH_4NO_3	t = 40°C % $Cu(NO_3)_2$	t = 40°C % NH_4NO_3
$Cu(NO_3)_2.\frac{5}{2}H_2O$	61		62.6	
	55.8	12.75	56.9	11.9
	50.0	27.41	50.7	24.1
			48.1	36.4
$Cu(NO_3)_2.\frac{5}{2}H_2O + Cu(NO_3)_2.3NH_4NO_3$	45.04*	39.00*	47.9	36.7
$Cu(NO_3)_2.3NH_4NO_3$			48.00	36.7
			45.9	39.2
			43.9	41.7
$Cu(NO_3)_2.3NH_4NO_3 + NH_4NO_3$	43.9	40.6	42.0	43.9
NH_4NO_3	43.01	38.24	36.8	43.6
	38.07	38.35	28.4	47.5
	33.96	39.95	14.17	58.4
	26.37	44.82	8.2	65.2
	9.80	59.95		75.0
		71.18		

* Mean of two results.

NO_3^- NH_4^+ Al^{+++}
$H_2O + NH_4OH + NH_4NO_3 + Al(OH)_3$
t = 20°C (12)

M NH_4OH/l	% NH_4NO_3	g $Al(OH)_3$/l
$Al(OH)_3.?H_2O$		
1.0	5.0	0.187
1.0	10.0	0.082
1.0	20.0	0.045
1.0	30.0	0.035
0.50	5.0	0.145
0.50	10.0	0.012
t = 30°C		
1.0	5.0	0.143
1.0	10.0	0.066
0.50	5.0	0.080
0.5	10.0	0.009

NO_3^- NH_4^+ Al^{+++} K^+
$H_2O + NH_4OH + NH_4NO_3 + Al(OH)_3 + KNO_3$
t = 20°C (12)

M NH_4OH/l	% KNO_3	g $Al(OH)_3$/l
$Al(OH)_3.?H_2O$		
1.0	5.0	0.760
1.0	10.0	1.310
0.5	5.0	0.450
0.5	10.0	0.485
t = 30°C		
1.0	5.0	1.12
1.0	10.0	1.32
0.5	5.0	0.713
0.5	10.0	1.033

NO_3^- NH_4^+ Na^+ (125)
$H_2O + NH_4NO_3 + NaNO_3$

Solid phases	Liquid phase—g per 100g H_2O					
	t = 0°C		t = 15°C		t = 30°C	
	NH_4NO_3	$NaNO_3$	NH_4NO_3	$NaNO_3$	NH_4NO_3	$NaNO_3$
$NaNO_3$	0	73.33	24.03	81.21	0	96.12
$NaNO_3$			42.81	79.34		
$NaNO_3$			64.60	78.06		
$NaNO_3$			110.90	75.81		
$NaNO_3$			152.00	75.35		
$NaNO_3 + NH_4NO_3$	105.50	66.00	155.30	75.38	220.80	88.31
NH_4NO_3	118.40	0	156.10	60.76	232.60	0
NH_4NO_3			159.00	36.50		
NH_4NO_3			160.00	27.79		
NH_4NO_3			162.30	17.63		
NH_4NO_3			167.40	0		

NO_3^- NH_4^+ K^+ (52)
$H_2O + NH_4NO_3 + KNO_3$
t = 17°C (52); *v.* Fig. 146

	Solid phases	Liquid phase—g per 100g H_2O	
		NH_4NO_3	KNO_3
A	NH_4NO_3	179.3	0.0
	Solid soln. I*	182.0	4.88
B	Solid soln. I* + Solid soln. II†	184.0	8.55
	Solid soln. II†	161.5	26.40
	Solid soln. II†	156.5	33.3
C	Solid soln. II† + Solid soln. III‡	143.0	43.5
	Solid soln. III‡	111.4	39.3
	Solid soln. III‡	69.3	32.7
	Solid soln. III‡	44.9	29.4
	Solid soln. III‡	24.9	27.5
	Solid soln. III‡	20.1	26.7
	Solid soln. III‡	9.62	26.4
	Solid soln. III‡	3.93	26.9
D	KNO_3	0.0	28.0

* Solid soln. I contains from 100 to 97.4 % NH_4NO_3.
† Solid soln. II contains from 93.1 to 49.2 % NH_4NO_3.
‡ Solid soln. III contains from 14 to 0 % NH_4NO_3.

t = 25°C (6)

Solid phases	M % NH_4NO_3	Liquid phase	
		% NH_4NO_3	% KNO_3
KNO_3	0	0.0	27.86
Solid soln. I*	2.29	13.48	23.53
Solid soln. I*	4.60	25.56	21.38
Solid soln. I*	9.73	39.45	19.27
Solid soln. I* + Solid soln. II†	36.43	51.16	16.90
Solid soln. I* + Solid soln. II†	45.92	51.57	16.92
Solid soln. II†	65.65	51.56	16.69
Solid soln. II†	73.85	54.80	13.95
Solid soln. II†	85.09	59.93	8.62
Solid soln. II†	88.49	61.42	7.26
Solid soln. II†	95.96	65.63	2.71
NH_4NO_3		67.70	0.0

* Solid soln. I varies from 0 to 13.5 % NH_4NO_3.
† Solid soln. II from 65 to 100 % NH_4NO_3.

NO_3^- BiO^+: $H_2O + HNO_3 + Bi(OH)_3$
t = 25°C (363)

M_{Bi}/l	M_{NO_3}/l	M_{Bi}/l	M_{NO_3}/l
$BiONO_3.H_2O$			
0.002713	0.1027	0.09956	0.6969
0.01449	0.2168	0.1592	0.9537
0.04944	0.4485	0.2354	1.2547

NO_3^- CO_3^{--} Na^+ (238): $H_2O + NaNO_3 + Na_2CO_3$

Solid phases	Liquid phase			
	t = 10°C		t = 24.2°C	
	% Na_2CO_3	% $NaNO_3$	% Na_2CO_3	% $NaNO_3$
$Na_2CO_3.10H_2O$	10.70		2.77	
$Na_2CO_3.10H_2O + Na_2CO_3.7H_2O$			15.29	26.67
$Na_2CO_3.7H_2O$			13.76	30.39
$Na_2CO_3.7H_2O + NaNO_3$			11.80	34.01
$NaNO_3$			3.13	44.67
$NaNO_3$		44.60		48.36
$NaNO_3.Na_2CO_3.10H_2O$	4.88	39.32		

NO_3^- CO_3^{--} Na^+ K^+; *v.* p. 360

NO_3^- CO_3^{--} K^+ (238): $H_2O + KNO_3 + K_2CO_3$

Solid phases	Liquid phase			
	t = 10°C		t = 24.2°C	
	% K_2CO_3	% KNO_3	% K_2CO_3	% KNO_3
$K_2CO_3.\frac{3}{2}H_2O$	52.01		52.95	
$K_2CO_3.\frac{3}{2}H_2O + KNO_3$	51.17	1.27	51.89	1.45
KNO_3			45.81	2.02
KNO_3			39.07	4.15
KNO_3			24.56	9.37
KNO_3			23.07	10.72
KNO_3			9.21	20.14
KNO_3		17.28		27.36

NO_3^- $C_2O_4^{--}$ Ag^+
$H_2O + HNO_3 + Ag_2C_2O_4$
t = 25°C (185)

% HNO_3	% $Ag_2C_2O_4$
$Ag_2C_2O_4$	
1.572	0.1334
3.110	0.2149
5.995	0.3599
11.390	0.6735
22.036	1.4993
29.095	2.4974
30.219	2.7857

NO_3^- $C_2O_4^{--}$ La^{+++}
$H_2O + La(NO_3)_3 + La_2(C_2O_4)_3$
t = 25°C (222)

% $La_2(C_2O_4)_3$	% $La(NO_3)_3$
$La_2(C_2O_4)_3.8H_2O$	
0.28	5.06
0.88	14.04
1.46	22.15
2.01	28.63
2.41	34.61

NO_3^- $C_2O_4^{--}$ La^{+++}.—(*Cont'd*)

% $La_2(C_2O_4)_3$	% $La(NO_3)_3$
$La_2(C_2O_4)_3.8H_2O$	
2.59	36.24
2.67	37.42
3.00	39.89
$La_2(C_2O_4)_3.8H_2O + La_2(C_2O_4)_3.5H_2O$	
3.32	42.27
$La_2(C_2O_4)_3.5H_2O + La_2(C_2O_4)_3.3H_2O$	
2.68	45.26
$La_2(C_2O_4)_3.3H_2O$	
2.64	46.39
2.52	51.30
2.41	54.11
2.32	56.54
$La_2(C_2O_4)_3.3H_2O + La(NO_3)_3$	
2.23	59.03
$La(NO_3)_3$	
2.10	59.03
0.67	59.91
0	60.17

NO_3^- CO_3^{--} Na^+ K^+ (219, 238)

$H_2O + NaNO_3 + K_2CO_3$; *v.* Fig. 147

	Solid phases	Liquid phase—M per 1000M H_2O							
		t = 10°C				t = 24.2°C; *v.* Fig. 147†			
		0.5-K_2CO_3	KNO_3	0.5-Na_2CO_3	$NaNO_3$	0.5-K_2CO_3	KNO_3	0.5-Na_2CO_3	$NaNO_3$
A	$Na_2CO_3.10H_2O$			40.64				96.88	
B	$Na_2CO_3.10H_2O$							89.35	97.24
	$Na_2CO_3.10H_2O + NaNO_3$			29.69	150.10				
C	$Na_2CO_3.10H_2O + NaNO_3$							72.47	132.12
D	$NaNO_3$				170.28				193.28*
E	$NaNO_3 + KNO_3$		53.89		178.16		77.62*		215.14*
F	KNO_3		74.37				66.96*		
G	$KNO_3 + K_2CO_3.\frac{3}{2}H_2O$		280.08		4.74	289.44	5.508		
H	$K_2CO_3.\frac{3}{2}H_2O$	282.17				293.0			
I	$K_2CO_3.\frac{3}{2}H_2O + KNaCO_3.6H_2O$	273.96		20.76		279.57		38.09	
	$NaNO_3 + KNO_3 + Na_2CO_3.10H_2O$		38.48	22.28	161.24				
J	$KNaCO_3.6H_2O + Na_2CO_3.10H_2O$					62.48*		129.12*	
P	$K_2CO_3.\frac{3}{2}H_2O + KNO_3 + KNaCO_3.6H_2O$					264.17	11.23	26.42	
Q	$KNO_3 + Na_2CO_3.10H_2O + KNaCO_3.6H_2O$	4.802	25.40	54.46		3.31	42.19	130.46	
R	$Na_2CO_3.10H_2O + KNO_3 + NaNO_3$						50.4	73.98	149.94
	$KNaCO_3.6H_2O + K_2CO_3.\frac{3}{2}H_2O + KNO_3$	266.68	2.57	17.93					

* By graphical interpolation. † Data for system $Na_2CO_3.10H_2O + Na_2CO_3.7H_2O + KNO_3$ lacking.

NH_4^+ HCO_3^- Na^+ (124, 125, 279)

$H_2O + NH_4HCO_3 + NaHCO_3$

Solid phases	Liquid phase—g per 100g H_2O (125)						Liquid phase (279)					
	t = 0°C		t = 15°C		t = 30°C		t = 15°C		t = 30°C*		t = 40°C*	
	$NaHCO_3$	NH_4HCO_3	$NaHCO_3$	NH_4HCO_3	$NaHCO_3$	NH_4HCO_3	% $NaHCO_3$	% NH_4HCO_3	% $NaHCO_3$	% NH_4HCO_3	% $NaHCO_3$	% NH_4HCO_3
$NaHCO_3$	6.90		8.80		11.03		7.93					
			8.00	2.30			7.26	1.99				
			7.46	4.40			6.67	3.93				
			6.69	8.57			5.79	7.44				
$NaHCO_3 + NH_4HCO_3$	4.82	10.94	5.93	17.06	7.21	25.57	4.82	13.88	4.72	13.61	5.34	22.45

* Under the pressure of $CO_2 + NH_3$ due to decomposition of the NH_4HCO_3 in the solution.

NH_4^+ HCO_3^- Na^+.—(*Cont'd.*)

t = 35°C† (124)

% $NaHCO_3$	% NH_4HCO_3
NH_4HCO_3	
0.0	24.02
$NH_4HCO_3 + NaHCO_3$	
5.14	21.55
$NaHCO_3$	
5.45	21.28
8.06	8.29
9.19	3.49
10.38	0.0

† Under pressure of 3 atm. of CO_2.

NO_3^- $C_2O_4^{--}$ Na^+ (82)

$H_2O + NaNO_3 + Na_2C_2O_4$

°C	% $NaNO_3$	% $Na_2C_2O_4$
$NaNO_3 + Na_2C_2O_4.H_2O$		
15	45.86	0.051
50	53.06	0.047

NO_3^- $C_2O_4^{--}$ K^+ (82)

$H_2O + KNO_3 + K_2C_2O_4$

°C	% KNO_3	% $K_2C_2O_4$
$KNO_3 + K_2C_2O_4.H_2O$		
19	11.6	20.38
50	28.29	19.63

NO_3^- $C_2H_3O_2^-$ Ag^+

$H_2O + HC_2H_3O_2 + AgNO_3$

t = 25°C (185)

% HNO_3	% $AgC_2H_3O_2$
$AgC_2H_3O_2$	
0.0	1.1074
2.850	7.9580
5.258	14.201
8.904	24.262
14.021	37.367
15.844	42.024
17.773	47.437

NO_3^- $C_2H_2ClO_2^-$ Ag^+

$H_2O + HC_2H_2ClO_2 + AgNO_3$

t = 25°C (185)

% HNO_3	% $AgC_2H_2ClO_2$
$AgC_2H_2ClO_2$	
0.0	1.504
1.488	4.827
2.833	8.510
5.234	14.582
8.883	24.441
13.983	37.229
15.751	42.059

NO_3^- $HC_4H_4O_6^-$ K^+

$H_2O + KNO_3 + KHC_4H_4O_6$

t = 24°C (283)

M_{KNO_3}/l*	$M_{KHC_4H_4O_6}$/l*
$KHC_4H_4O_6$	
0	0.0347
0.05	0.01953
0.10	0.01355
0.20	0.00901

* Data mean of two results.

NO_3^- Pb^{++} Cu^{++}

$H_2O + Pb(NO_3)_2 + Cu(NO_3)_2$

t = 20°C (123)

g per 100g H_2O

$Cu(NO_3)_2$	$Pb(NO_3)_2$
$Pb(NO_3)_2$	
0.0	55.11
7.72	39.34
15.04	27.80
24.63	19.05
33.25	14.70
37.96	13.08
60.32	8.19
83.11	5.37
100.29	3.53
$Pb(NO_3)_2 + Cu(NO_3)_2.6H_2O$	
127.70	2.33
$Cu(NO_3)_2.6H_2O$	
127.40	0

NO_3^- Pb^{++} Ba^{++} (129)
$H_2O + Pb(NO_3)_2 + Ba(NO_3)_2$

Solid phase		Liquid phase—M per 1000M H_2O	
M % $Ba(NO_3)_2$	M % $Pb(NO_3)_2$	$Ba(NO_3)_2$	$Pb(NO_3)_2$
	t = 15°C		
25.10	74.90	2.726	23.14
81.31	18.69	4.126	7.80
86.95	13.05	4.610	4.836
	t = 30°C		
3.06	96.94	0.669	34.96
14.50	85.50	2.213	32.21
31.22	68.78	3.249	28.61
63.61	36.39	5.050	18.91
65.70	34.30	4.916	18.38
81.90	18.10	5.916	10.64
91.67	8.33	6.419	4.781
	t = 47°C		
10.81	89.19	1.958	41.05
16.74	83.26	2.831	40.10
28.32	71.68	3.820	36.40
87.52	12.48	8.854	9.234

NO_3^- Pb^{++} Ba^{++}.—(*Continued*)

Solid phase—g per 100g solid (148)		Liquid phase	
$Ba(NO_3)_2$	$Pb(NO_3)_2$	% $Ba(NO_3)_2$	% $Pb(NO_3)_2$
	t = 25°C		
12.46	87.54	1.59	34.60
23.44	76.56	2.65	31.13
60.73	39.27	4.23	22.73
84.56	15.44	6.66	8.96
89.58	10.42	7.31	6.26
96.41	3.59	8.64	1.63
	t = 50°C		
11.69	88.31	2.57	40.82
30.98	69.02	3.83	37.78
58.75	41.25	6.32	29.31
91.22	8.78	11.05	10.34
93.33	6.67	12.68	5.72

NO_3^- Pb^{++} K^+ (149): $H_2O + Pb(NO_3)_2 + KNO_3$

Solid phases	Liquid phase					
	t = 25°C		t = 50°C		t = 100°C	
	% $Pb(NO_3)_2$	% KNO_3	% $Pb(NO_3)_2$	% KNO_3	% $Pb(NO_3)_2$	% KNO_3
$Pb(NO_3)_2$......	37.17		44.79		55.65	
					44.50	36.90
$Pb(NO_3)_2 + KNO_3$	41.93	24.67	42.14	33.14		
KNO_3...........		27.39		45.51		71.10

NO_3^- Pb^{++} Ba^{++} K^+ (148)
$H_2O + Pb(NO_3)_2 + Ba(NO_3)_2 + KNO_3$

Solid phases	Liquid phase					
	t = 25°C			t = 50°C		
	% KNO_3	% $Pb(NO_3)_2$	% $Ba(NO_3)_2$	% KNO_3	% $Pb(NO_3)_2$	% $Ba(NO_3)_2$
$Ba(NO_3)_2.2KNO_3$*..............................	15.26	2.12	6.05	27.40	15.89	8.11
	17.39	11.44	3.40	28.28	27.00	5.68
	16.01	21.25	4.33	32.61	38.93	2.15
	17.87	35.90	2.46			
	23.41	37.68	2.11			
$Ba(NO_3)_2.2KNO_3$* + KNO_3.........................	25.75	34.65	1.16			
$Ba(NO_3)_2.2KNO_3 + KNO_3$........................	25.74	32.63	1.92	35.48	33.62	2.01
	26.78	23.26	1.76	36.91	29.22	2.24
	27.23	15.28	2.32	38.06	24.98	2.59
	27.69	9.85	1.87	39.43	19.96	2.85
	27.74	4.95	1.92	40.90	14.64	3.32
				41.39	13.01	3.44
				41.86	10.35	3.69
$Ba(NO_3)_2.2KNO_3$* + KNO_3......................	25.22	40.46	0.72	33.25	40.88	1.02
	25.0	39.84	1.18	33.41	40.19	1.51
	25.0	38.0	1.59	32.64	39.82	2.40
	24.91	37.48	1.80			

* Contained small amounts of $Pb(NO_3)_2.2KNO_3$.

NO_3^- Pb^{++} Na^+ (149)
$H_2O + Pb(NO_3)_2 + NaNO_3$; *v.* Fig. 148

	Solid phases	Liquid phase							
		t = 0°C		t = 25°C		t = 50°C		t = 100°C	
		% $Pb(NO_3)_2$	% $NaNO_3$	% $Pb(NO_3)_2$	% $NaNO_3$	% $Pb(NO_3)_2$	% $NaNO_3$	% $Pb(NO_3)_2$	% $NaNO_3$
A	$Pb(NO_3)_2$..................	28.70		37.17		44.79		55.65	
B		25.80	2.91	27.86	10.04	29.22	17.51	50.78	4.24
C	$Pb(NO_3)_2 + NaNO_3$...........			15.47	40.32	17.25	43.84		
D	$NaNO_3$........................				47.86		53.29		

NO_3^- $Pb(N_3)_2$ Na^+; *v.* p. 356

NO_3^- Tl^+ K^+: $H_2O + TlNO_3 + KNO_3$; t = 25°C (129)

Solid phases	M % KNO_3	M % $TlNO_3$	Liquid phase—M per l KNO_3	Liquid phase—M per l $TlNO_3$
Solid soln. I*	100.00	0.00	3.4682	0.00
	99.92	0.08	3.2515	0.0089
	99.80	0.20	3.2851	0.0231
	99.43	0.57	3.2981	0.0663
	98.22	1.78	3.2944	0.1869
	97.81	2.19	3.1724	0.2390
	97.23	2.77	3.2658	0.3238
Solid solns. I + II			4.2326	0.4652
Solid soln. II†	6.67	93.33	2.4233	0.3806
	0.00	100.00	0.00	0.4361

* Solid solution I from 100 to 94 % KNO_3. † Solid solution II from 72.96 to 0 % KNO_3.

NO_3^- Zn^{++} Nd^{+++} (301)
$H_2O + Zn(NO_3)_2 + Nd(NO_3)_3$

°C	% Nd_2O_3	% ZnO	% double salt
$2Nd(NO_3)_3.3Zn(NO_3)_2.24H_2O$			
15	14.0	10.15	69.1
30	14.88	10.79	73.5
50	15.86	11.53	78.3
70	17.15	12.33	84.6

NO_3^- Zn^{++} Pr^{+++} (301)
$H_2O + Zn(NO_3)_2 + Pr(NO_3)_3$

°C	% Pr_2O_3	% ZnO	% double salt
$2Pr(NO_3)_3.3Zn(NO_3)_2.24H_2O$			
15	13.22	9.87	66.3
30	14.08	10.45	70.6
45	15.02	11.01	75.4
60	15.97	11.98	80.1

NO_3^- Cu^{++}: $H_2O + HNO_3 + Cu(NO_3)_2$; t = 15°C (305)

% HNO_3	% $Cu(NO_3)_2$	Solid phase
0.0	52.40	$Cu(NO_3)_2.3H_2O$
5.00	48.00	
10.00	44.00	

NO_3^- Hg^+
$H_2O + HNO_3 + HgNO_3$; t = 25°C (89)

Solid phases	Liquid phase M_{HNO_3}/l	Liquid phase M_{Hg}/l
$HgNO_3.H_2O + 3HgNO_3.Hg_2O.H_2O$	2.955	2.150
$3HgNO_3.Hg_2O.H_2O$	1.356	0.923
$3HgNO_3.Hg_2O.H_2O + HgNO_3.Hg_2O$	0.293	0.239
$HgNO_3.Hg_2O$	0.1579	0.1321
$HgNO_3.Hg_2O + HgNO_3.Hg_2O.\frac{3}{2}H_2O$	0.102	0.0807
$HgNO_3.Hg_2O.\frac{3}{2}H_2O$	0.0068	
$HgNO_3.Hg_2O.\frac{3}{2}H_2O + Hg_2O$	0.0016	

NO_3^- Hg^{++} (89): $H_2O + HNO_3 + HgO$

Solid phases	t = 15°C M_{HNO_3}/l	t = 15°C M_{Hg}/l	t = 25°C M_{HNO_3}/l	t = 25°C M_{Hg}/l	t = 50°C M_{HNO_3}/l	t = 50°C M_{Hg}/l
$Hg(NO_3)_2.H_2O + Hg(NO_3)_2.2HgO$	17.93	8.172	18.71	8.585		
$Hg(NO_3)_2.2HgO$			16.52	8.235		
			9.65	4.515		
			1.35	0.6182		
			0.646	0.2958		
			0.283	0.1252		
			0.123m	0.0545m		
$Hg(NO_3)_2.2HgO + HgO$	0.136	0.058	0.154	0.0675	0.284	0.1226
HgO	0.1156	0.0499	0.116	0.0494	0.231	
	0.0723	0.0303	0.072	0.0306	0.1156	0.0494
					0.0723	

NO_3^- Cu^{++} Ag^+ (305): $H_2O + Cu(NO_3)_2 + AgNO_3$

Solid phases	t = 0°C % $Cu(NO_3)_2$	t = 0°C % $AgNO_3$	t = 10°C % $Cu(NO_3)_2$	t = 10°C % $AgNO_3$	t = 15°C % $Cu(NO_3)_2$	t = 15°C % $AgNO_3$	t = 20°C % $Cu(NO_3)_2$	t = 20°C % $AgNO_3$	t = 30°C % $Cu(NO_3)_2$	t = 30°C % $AgNO_3$	t = 100°C % $Cu(NO_3)_2$	t = 100°C % $AgNO_3$
$AgNO_3$		55.60		63.60		66.70		68.30		74.10		90.00
$AgNO_3 + Cu(NO_3)_2.6H_2O$	40.90	12.10	40.00	12.50	47.60	12.10	51.10	11.60				
$AgNO_3 + Cu(NO_3)_2.3H_2O$									54.80	11.80	54.00	25.50
$Cu(NO_3)_2.6H_2O$	46.30		50.30		52.40		55.40					
$Cu(NO_3)_2.3H_2O$									60.90		71.50	

NO_3^- Cu^{++} Na^+
$H_2O + Cu(NO_3)_2 + NaNO_3$
t = 20°C (255)

% $Cu(NO_3)_2$	% $NaNO_3$
$Cu(NO_3)_2.6H_2O$	
55.94	0.0
55.76	2.07
54.34	4.29
$Cu(NO_3)_2.6H_2O + NaNO_3$	
53.30	5.27
$NaNO_3$	
46.32	8.19
29.25	19.89
3.38	43.51
0.0	48.60
$NaNO_3 + Cu(NO_3)_2.3H_2O$	
56.57m	5.66m
$Cu(NO_3)_2.3H_2O$	
57.0m	3.59m
57.0m	1.98m

NO_3^- Ag^+
$H_2O + HNO_3 + AgNO_3$
t = 30°C (256)

% HNO_3	% $AgNO_3$
$AgNO_3$	
0.0	73.22
1.119	69.87
2.854	64.64
5.51	57.27
10.47	45.09
18.91	29.37
26.59	20.32
40.33	10.36
56.48	4.22

t = 15°C (305)

% HNO_3	% $AgNO_3$
$AgNO_3$	
0	66.65
5	50.50
10	38.30

NO_3^- Mn^{++} Pr^{+++} (301)
$H_2O + Mn(NO_3)_2 + Pr(NO_3)_3$

°C	% Pr_2O_3	% MnO	% double salt
$2Pr(NO_3)_3.3Mn(NO_3)_2.24H_2O$			
15	14.60	9.44	71.8
30	15.42	9.75	75.9
45	16.24	10.40	79.9
60	17.43	11.15	85.8

NO_3^- Mn^{++} Nd^{+++} (301)
$H_2O + Mn(NO_3)_2 + Nd(NO_3)$

°C	% MnO	% Nd_2O_3	% double salt
$2Nd(NO_3)_3.3Mn(NO_3)_2.24H_2O$			
15	9.50	15.24	73.8
30	10.15	15.99	77.4
45	10.68	17.05	82.6
60	11.48	18.37	89.0

NO_3^- Fe^{+++}: $H_2O + HNO_3 + Fe_2O_3$

	Solid phases t = 25°C (67); v. Fig. 149	Liquid phase % Fe_2O_3	Liquid phase % N_2O_5
A	Probably basic salts	2.86	4.03
B		10.86	19.58
C	$Fe_2O_3.3N_2O_5.18H_2O$	15.22	30.50
D		9.95	36.30
E		6.11	42.70
F		5.02	47.50
G	$Fe_2O_3.4N_2O_5.18H_2O$	3.93	47.20
H		3.52	49.60
I	$Fe_2O_3.3N_2O_5.18H_2O$	4.49m	55.20m

NO_3^- Co^{++} Pr^{+++} (301)

$H_2O + Co(NO_3)_2 + Pr(NO_3)_3$

°C	% CoO	% Pr_2O_3	% double salt
$2Pr(NO_3)_3.3Co(NO_3)_2.24H_2O$			
15	9.30	13.64	67.6
30	9.75	14.28	70.8
45	10.13	14.98	74.3
60	10.79	15.89	78.8

NO_3^- Co^{++} Nd^{+++} (301)

$H_2O + Co(NO_3)_2 + Nd(NO_3)_3$

°C	% CoO	% Nd_2O_3	% double salt
$2Nd(NO_3)_3.3Co(NO_3)_2.24H_2O$			
15	9.28	14.0	68.3
30	9.84	14.84	72.4
45	10.43	15.71	76.6
60	11.16	16.63	81.1

NO_3^- Ni^{++} Pr^{+++} (301)

$H_2O + Ni(NO_3)_2 + Pr(NO_3)_3$

°C	% NiO	% Pr_2O_3	% double salt
$2Pr(NO_3)_3.3Ni(NO_3)_2.24H_2O$			
15	8.83	12.99	64.4
30	9.41	13.83	68.5
45	9.87	14.50	71.8
60	10.47	15.27	75.7

NO_3^- Ni^{++} Nd^{+++} (301)

$H_2O + Ni(NO_3)_2 + Nd(NO_3)_3$

°C	% NiO	% Nd_2O_3	% double salt
$2Nd(NO_3)_3.3Ni(NO_3)_2.24H_2O$			
15	9.13	14.01	68.4
30	9.73	14.66	71.5
45	10.12	15.41	75.10
60	10.89	16.36	79.80

NO_3^- CrO_4^{--} (276)

$H_2O + HNO_3 + H_2CrO_4$

t = 25°C; v. Fig. 150		t = 45°C	
% HNO_3	% CrO_3	% HNO_3	% CrO_3
CrO_3			
0.0	62.85	0.0	63.50
13.25	48.10	5.58	57.93
26.79	34.32	19.53	43.41
46.91	14.63	50.69	13.15
68.49	0.95	73.81	0.88
82.90	0.06	88.35	0.60
89.17	0.18	88.06	9.42
91.36	8.29		

NO_3^- UO_2^{++}

$H_2O + HNO_3 + UO_2(NO_3)_2$

t = 25°C (84.5)

% HNO_3	% $UO_2(NO_3)_2$
$UO_2(NO_3)_2.6H_2O$	
0	56.08
12.35	40.36
25.14	30.29
28.67	29.65
29.84	31.27
$UO_2(NO_3)_2.6H_2O + UO_2(NO_3)_2.3H_2O$	
30.43	36.77
$UO_2(NO_3)_2.3H_2O$	
31.15	37.99
32.31	36.28
46.12	27.18
50.43	25.79
53.20	26.77
$UO_2(NO_3)_2.3H_2O + UO_2(NO_3)_2.2H_2O$	
53.71	27.49
$UO_2(NO_3)_2.2H_2O$	
55.24	27.24
60.38	23.65
66.71	22.29
68.83	22.49

NO_3^- UO_2^{++} K^+

$H_2O + HNO_3 + UO_2(NO_3)_2 + KNO_3$

t = 20°C (278)

% HNO_3	% $KNO_3.UO_2(NO_3)_2$
KNO_3	
0.0	46.09
5.50	45.05
10.01	49.95
$UO_2(NO_3)_2.6H_2O$	
15.85	47.09
$KNO_3.UO_2(NO_3)_2$	
15.83	47.23
22.06	44.84
32.47	35.06
44.81	25.32

% HNO_3	% $2KNO_3.UO_2(NO_3)_2$
KNO_3	
0.0	38.61
6.57	34.30
13.73	31.37
19.77	34.12
23.92	40.19
$2KNO_3.UO_2(NO_3)_2$	
32.83	34.34
$KNO_3.UO_2(NO_3)_2$	
31.75	36.51

NO_3^- Al^{+++} (272)

$H_2O + HNO_3 + Al(NO_3)_3$

°C	% HNO_3	% $Al(NO_3)_3$
$Al(NO_3)_3.9H_2O$		
4	19.75	19.65
5	50.65	1.50
5	70.65	0.23
19.8	15.45	27.10
20	46.05	5.86
20	71.35	0.73
40	11.95	34.60
40	38.50	16.30
40	44.80	13.05
40	64.50	4.15
40	65.35	4.14
60	4.93	44.35
60	17.15	36.40
60	18.90	36.00
60	32.65	29.10

t = 25°C (215)

% $Al(NO_3)_3$	% HNO_3
$Al(NO_3)_3.9H_2O$	
38.87	0.33
32.16	9.15
17.57	28.65
5.05	47.08
1.84	58.26
1.42	60.43
1.25	71.15
$Al(NO_3)_3.8H_2O$	
1.25	72.06
0.71	75.34
0.24	80.28
$Al(NO_3)_3.6H_2O$	
0.17	81.08
0.17	87.66
0.25	89.02
0.43	90.12

NO_3^- Al^{+++} K^+ (408)

$H_2O + Al(NO_3)_3 + KNO_3$

NO_3^- Mg^{++} Pr^{+++} (301)

$H_2O + Mg(NO_3)_2 + Pr(NO_3)_3$

°C	% MgO	% Pr_2O_3	% double salt
$2Pr(NO_3)_3.3Mg(NO_3)_2.24H_2O$			
15	4.97	13.55	63.0
30	5.24	14.29	66.4
50	5.55	15.27	71.0
70	6.14	16.65	77.5

NO_3^- Mg^{++} Nd^{+++} (301)

$H_2O + Mg(NO_3)_2 + Nd(NO_3)_3$

°C	% MgO	% Nd_2O_3	% double salt
$2Nd(NO_3)_3.3Mg(NO_3)_2.24H_2O$			
15	5.17	14.45	66.0
30	5.49	15.20	69.5
50	5.78	16.34	74.4
70	6.29	17.47	79.8

NO_3^- Mg^{++} Na^+

$H_2O + Mg(NO_3)_2 + NaNO_3$

t = 25°C (217)

% $Mg(NO_3)_2$	% $NaNO_3$
$Mg(NO_3)_2.6H_2O$	
43.25	0
40.84	3.37
40.0	5.12
$Mg(NO_3)_2.6H_2O + NaNO_3$	
38.25	9.22
$NaNO_3$	
34.24	11.10
25.25	18.26
9.82	36.58
0	47.60

NO_3^- Ca^{++} (27)

$H_2O + HNO_3 + Ca(OH)_2$

t = 25°C*

% CaO	% N_2O_5
$CaO.H_2O$	
0.1150	0
5.590	10.53
10.48	19.87
13.87	26.25
15.50	29.28
$2CaO.N_2O_5.3H_2O$	
15.75	29.83
16.56	31.49
18.35	35.05
18.93	36.21
$CaO.N_2O_5.4H_2O$	
19.76	38.01
19.80	38.18
t = 100°C	
$CaO.H_2O$	
0.0561	0
5.37	10.13
14.92	27.82
19.63	35.38
20.51	36.63
$CaO.H_2O + 2CaO.N_2O_5.2H_2O$	
21.13	37.50
$2CaO.N_2O_5.2H_2O$	
21.63	38.62
22.00	39.79
23.77	43.75
24.76	45.50
$2CaO.N_2O_5.2H_2O + 2CaO.N_2O_5.\frac{1}{2}H_2O$	
25.38	46.47
$2CaO.N_2O_5.\frac{1}{2}H_2O$	
25.51	47.03
26.18	48.61
26.73	49.86
$CaO.N_2O_5$	
27.33	51.09
26.98	51.17

* Cameron and Robinson (63) found as solid phases at 25°C, $CaO.H_2O$, a solid solution, $2CaO.N_2O_5.\frac{3}{2}H_2O$ and $CaO.N_2O_5.4H_2O$.

NO_3^- Ca^{++} Na^+ (237, 297)

$H_2O + Ca(NO_3)_2 + NaNO_3$

Solid phases (237)	Liquid phase, t = 9°C, % $Ca(NO_3)_2$	t = 9°C, % $NaNO_3$	t = 25°C, % $Ca(NO_3)_2$	t = 25°C, % $NaNO_3$
$Ca(NO_3)_2.4H_2O$	51.53		58.64	
$Ca(NO_3)_2.4H_2O + NaNO_3$	46.08	12.56	52.73	12.08
$NaNO_3$		44.60		47.90
(297)	t = 50°C		t = 94.5°C	
$Ca(NO_3)_2.3H_2O$	73.80			
$Ca(NO_3)_2.3H_2O + NaNO_3$	69.40	11.10		
$Ca(NO_3)_2$			78.40	
			74.6	4.3
			68.9	14.3
$Ca(NO_3)_2 + NaNO_3$			66.7	18.0
$NaNO_3$	62.70	11.50	60.2	17.8
	61.3	12.2	47.0	24.7
	52.3	14 9	20.5	43.9
	39.2	21.0		62.6
	30.7	27.4		
	22.6	34.5		
		52.80		

NO_3^- Ca^{++} K^+

$H_2O + Ca(NO_3)_2 + KNO_3$

t = 30°C (19); *v.* Fig. 151

	Solid phases*	Liquid phase, % $Ca(NO_3)_2$	% KNO_3	% H_2O
A	$Ca(NO_3)_2.4H_2O$	59.65		40.35
B		57.40	13.80	28.80
		58.90	17.20	23.90
D	$Ca(NO_3)_2.4H_2O + Ca(NO_3)_2$?	66.00	13.00	21.00
E	$Ca(NO_3)_2$?	58.30	22.40	19.30
F	$Ca(NO_3)_2$? $+ KNO_3$	52.00	30.40	17.60
G	KNO_3	43.90	23.25	32.85
H		24.70	22.50	52.80
I			31.40	68.60

* Owing to the viscosity of the liquid phases here concerned the author was not able to obtain conclusive evidence (1), that KNO_3 existed as a stable solid phase from G to F; (2), that $Ca(NO_3)_2$ rather than a hydrated salt existed from F to D; and (3), that $Ca(NO_3)_2.4H_2O$ existed as a stable solid from D to A.

NO_3^- Sr^{++}

$H_2O + Sr(OH)_2 + Sr(NO_3)_2$

t = 25°C (296)

g per 100g H_2O

SrO	$Sr(NO_3)_2$	SrO	$Sr(NO_3)_2$
$Sr(NO_3)_2$		$SrO.9H_2O$	
0.0	79.27	1.34	52.90
0.78	80.83	1.14	40.83
$Sr(NO_3)_2 + SrO.9H_2O$		1.01	28.80
1.76	81.06	0.95	23.83
$SrO.9H_2O$		0.84	12.78
1.71	74.27	0.78	4.45
1.51	63.71		

NO_3^- Sr^{++} K^+ (127): $H_2O + Sr(NO_3)_2 + KNO_3$

Solid phases	Liquid phase, t = 20°C, % KNO_3	t = 20°C, % $Sr(NO_3)_2$	t = 40°C, % KNO_3	t = 40°C, % $Sr(NO_3)_2$
KNO_3	24.27	0	39.00	0
	22.90	5.49	30.26	23.70
	21.01	17.10		
	19.49	34.91		
$KNO_3 + Sr(NO_3)_2.4H_2O$	19.69	39.56		
$KNO_3 + Sr(NO_3)_2$			26.90	38.52
$Sr(NO_3)_2.4H_2O$	17.56	40.37		
	12.65	41.12		
	10.00	40.70		
	0	41.43		
$Sr(NO_3)_2$			22.50	40.22
			11.19	44.19
			0	47.70

NO_3^- Ba^{++}: $H_2O + HNO_3 + BaO$

t = 25°C (295)

g per 100g H_2O

BaO	$Ba(NO_3)_2$
$Ba(NO_3)_2$	
0.0	10.30
1.55	10.66
3.22	11.04
$Ba(NO_3)_2 + BaO.H_2O$	
5.02	11.48
$BaO.H_2O$	
4.93	10.21
4.83	8.66
4.72	7.01
4.55	6.82
4.52	4.44
4.48	3.47
4.42	2.53
4.35	1.45
4.29	0.0

t = 30°C (256)

% $Ba(NO_3)_2$	% HNO_3
$Ba(NO_3)_2$	
10.25	0.0
8.89	0.77
5.91	2.95
4.39	4.45
3.33	5.94
2.59	7.38
2.08	8.82
1.45	11.67
0.79	17.07
0.50	22.14
0.51	22.18
0.33	27.12

NO_3^- Ba^{++} Na^+ (87, 88)

$H_2O + Ba(NO_3)_2 + NaNO_3$

Solid phases	Liquid phase, t = 0°C, % $Ba(NO_3)_2$	t = 0°C, % $NaNO_3$	t = 30°C, % $Ba(NO_3)_2$	t = 30°C, % $NaNO_3$
$Ba(NO_3)_2$	4.74		10.33	0.0
	4.03	0.61	8.58	2.33
	3.34	1.68	5.28	7.09
	1.60	8.02	3.89	12.07
	1.53	20.24	3.54	14.41
	1.56	27.74	3.20	17.87
	1.55	30.81	3.07	19.06
	1.53	33.79	2.81	23.55
	1.49	35.83	2.27	41.22
$Ba(NO_3)_2 + NaNO_3$	1.55*	41.37*	2.11	48.22
$NaNO_3$	0.51	41.68	1.00	48.50
		42.47		49.16

* Mean of four determinations.

Continued on p. 365

NO_3^- Ba^{++} K^+: $H_2O + Ba(NO_3)_2 + KNO_3$

Solid phases	Liquid phase (127) t = 9.1°C % $Ba(NO_3)_2$	t = 9.1°C % KNO_3	t = 21.1°C % $Ba(NO_3)_2$	t = 21.1°C % KNO_3	t = 35°C % $Ba(NO_3)_2$	t = 35°C % KNO_3
$Ba(NO_3)_2$	6.25	0	8.46	0	11.39	0
			7.47	2.12	8.18	12.99
			6.35	5.98	8.08	17.48
			6.06	8.47		
$Ba(NO_3)_2 + Ba(NO_3)_2.2KNO_3$	4.20	8.15	5.98	13.24	8.42	19.75
$Ba(NO_3)_2.2KNO_3$	1.98	12.02	3.35	18.24	5.85	24.00
			2.30	21.47	5.02	26.05
$Ba(NO_3)_2.2KNO_3 + KNO_3$	0.98	16.80	1.76	24.86	3.02	34.87
KNO_3	0	16.76	0	24.77	0	35.01

Solid phases	Liquid phase (148) t = 25°C % $Ba(NO_3)_2$	t = 25°C % KNO_3	t = 50°C % $Ba(NO_3)_2$	t = 50°C % KNO_3
KNO_3	0.0	27.39	2.34	45.45
			4.22	44.88
$KNO_3 + Ba(NO_3)_2.2KNO_3$	2.44	27.67	5.11	44.66
$Ba(NO_3)_2.2KNO_3$	4.88	17.14	5.64	40.31
			6.99	35.75
			10.16	30.08
$Ba(NO_3)_2.2KNO_3 + Ba(NO_3)_2$	6.60	14.80	10.81	28.86
$Ba(NO_3)_2$	6.57	9.13	10.43	24.14
	7.72	3.80	10.14	18.76
	9.28	0.0	10.92	10.53
			12.73	3.93
			14.67	0.0

NO_3^- Na^+ K^+ (238, 307): $H_2O + NaNO_3 + KNO_3$

Solid phases	Liquid phase—g per 100g H_2O (307) t = 5°C KNO_3	t = 5°C $NaNO_3$	t = 25°C KNO_3	t = 25°C $NaNO_3$	t = 50°C KNO_3	t = 50°C $NaNO_3$	t = 100°C KNO_3	t = 100°C $NaNO_3$	Liquid phase (238) t = 10°C % $NaNO_3$	t = 10°C % KNO_3	t = 24.2°C % $NaNO_3$	t = 24.2°C % KNO_3
KNO_3	16.83		38.85		85.10		246			17.28		27.44
	15.57	22.30	37.96	5	87.53	57.89					19.96	22.45
			37.49	10							39.57	17.93
			37.42	15								
			37.54	20								
			39.39	40								
			41.87	60								
$KNO_3 + NaNO_3$	18.10	82.10	46.15	100.9	90.2	134.9	218	233.6	38.98	14.04	41.50	17.77
$NaNO_3$		76.30	30	97.95		114.1		176		44.60	44.76	6.08
			20	96.06							47.74	
			10	94.47								
			5	93.39								
				91.86								

NO_3^- Ba^{++} Na^+.—*(Continued from p. 364)*
t = 20°C (126)

% $NaNO_3$	% $Ba(NO_3)_2$	% $NaNO_3$	% $Ba(NO_3)_2$
$Ba(NO_3)_2$		$NaNO_3 + Ba(NO_3)_2$	
37.07	2.07	45.74	1.86
14.59	2.49		
5.61	3.89		

NO_3^- K^+ (49, 154, 278); *cf.* (410): $H_2O + HNO_3 + KOH$

Solid phases	Liquid phase t = 20°C (49) M_{KOH}/l	t = 20°C (49) M_{KNO_3}/l	t = 0°C (154)* M % KNO_3	t = 0°C (154)* M % HNO_3	t = 21°C (154)* M % KNO_3	t = 21°C (154)* M % HNO_3	t = 20°C (278) % HNO_3	t = 20°C (278) % KNO_3
KNO_3	4.71	0.847	2.34		5.4			23.90
	7.90	0.455	1.61	2.57	2.9	5.8	8.40	16.04
	9.41	0.364	1.45	2.90	24.4	48.8	17.47	12.65
	10.95	0.298	1.47	4.29			26.93	10.23
	12.19	0.271	1.53	6.42			34.72	13.20
	14.02	0.241	1.66	10.50			42.16	15.68
	14.85	0.232	2.45	16.20			50.17	16.39
	15.02	0.233	25.20	50.40			54.01	22.84
							59.61	25.48
							60.48	32.80
$KNO_3.2HNO_3$			25.70	51.40	29.0	71.0		
			17.80	82.20	32.3	64.6		
$KNO_3.2HNO_3 + KNO_3$					37.8	62.2		

* Includes data from Engel (118).

NH_4^+ $H_2PO_4^-$ (99, 294)
$H_2O + NH_4OH + H_3PO_4$; *v.* Fig. 152

	Solid phases	Liquid phase t = 25°C (99) % $(NH_4)_2O$	t = 25°C (99) % P_2O_5	t = 25°C (294) % $(NH_4)_2O$	t = 25°C (294) % P_2O_5
A	$3(NH_4)_2O.P_2O_5.6H_2O$	19.32	0.59	36.66	2.91
		13.07	1.42	29.89	3.05
B		7.68	3.27	22.78	6.18
		7.91	7.24	17.16	9.45
C		8.64	9.38	10.91	13.0
		12.45	16.48	11.14	18.25
D	$3(NH_4)_2O.P_2O_5.6H_2O + 2(NH_4)_2O.P_2O_5.H_2O$	16.84	22.44		
	$2(NH_4)_2O.P_2O_5.H_2O$	16.71	22.94	16.33	24.22
		17.65	30.82	17.96	28.05
		18.64	34.23	18.25	31.11
				19.0	33.81
E	$2(NH_4)_2O.P_2O_5.H_2O + (NH_4)_2O.P_2O_5.2H_2O$	18.59	34.30		

NH_4^+ $H_2PO_4^-$.—(*Continued*)

	Solid phases	Liquid phase t = 25°C (99) % $(NH_4)_2O$	% P_2O_5	t = 25°C (294) % $(NH_4)_2O$	% P_2O_5
G	$(NH_4)_2O.P_2O_5.2H_2O$	17.47	32.23	13.62	26.78
		7.07	18.38	10.52	23.44
		7.95	54.67	6.72	18.25
				6.25	25.71
				7.21	43.25

NH_4^+ AsO_2^-

$H_2O + NH_4OH + HAsO_2$

t = 30°C (351)

% NH_3	% AsO_2
As_2O_3	
0	2.26
1.41	10.98
2.86	21.17
$As_2O_3.(NH_4)_2O$	
2.88	18.43
3.13	12.30
3.91	7.63
6.95	4.72
9.93	3.20
13.98	2.50
14.28	2.16

NH_4^+ $C_2O_4^{--}$ Th^{++++}

$H_2O + (NH_4)_2C_2O_4 + Th(C_2O_4)_2$

t = 25°C (168)

M per 1000g soln.

$(NH_4)_2C_2O_4$	$Th(C_2O_4)_2$
$Th(C_2O_4)_2.6H_2O$	
0.00033	0.00005
0.00044	0.000081
0.00072	0.000120
0.00109	0.000200
0.00120	0.000208
0.00130	0.000220
0.00148	0.000250
0.00153	0.000260
$2Th(C_2O_4)_2.(NH_4)_2C_2O_4.7H_2O$	
0.0023	0.00038
0.041	0.0121
0.090	0.0210
0.145	0.0382
0.225	0.0599

NH_4^+ $C_2O_4^{--}$ Th^{++++}.—(*Continued*)

M per 1000g soln.

$(NH_4)_2C_2O_4$	$Th(C_2O_4)_2$
$Th(C_2O_4)_2.(NH_4)_2C_2O_4.3H_2O$	
0.3012	0.0950
0.3700	0.1203
0.6012	0.1950
$Th(C_2O_4)_2.(NH_4)_2C_2O_4.3H_2O + (NH_4)_2C_2O_4.H_2O$	
1.480	0.563

t = 25°C (223)

% $(NH_4)_2C_2O_4$	% $Th(C_2O_4)_2$
$Th(C_2O_4)_2.?H_2O$	
0.03	0.03
0.48	0.20
0.79	0.35
$(NH_4)_2C_2O_4.2Th(C_2O_4)_2.2H_2O$	
0.89	0.57
1.65	1.38
4.83	5.06
10.27	12.35
15.07	19.54
$(NH_4)_2C_2O_4.2Th(C_2O_4)_2.2H_2O + (NH_4)_2C_2O_4.2Th(C_2O_4)_2.7H_2O$	
17.49	23.19
$(NH_4)_2C_2O_4.2Th(C_2O_4)_2.7H_2O + (NH_4)_2C_2O_4$	
17.13	22.16
$(NH_4)_2C_2O_4$	
14.52	17.84
11.68	12.77
8.70	7.40
5.62	1.43

NH_4^+ $C_2O_4^{--}$ UO_2^{++}; *v.* p. 367

NH_4^+ CO_3^{--}; *v.* p. 367

NH_4^+ CO_3^{--} Na^+ (273): $H_2O + (NH_4)_2CO_3 + Na_2CO_3$

Solid phases	Liquid phase t = 0°C % $(NH_4)_2CO_3$	% Na_2CO_3	t = 15°C % $(NH_4)_2CO_3$	% Na_2CO_3
$(NH_4)_2CO_3$	35.82		38.27	
$(NH_4)_2CO_3 + Na_2CO_3.\frac{5}{2}H_2O$	35.23	9.88	36.00	8.78
$Na_2CO_3.\frac{5}{2}H_2O + Na_2CO_3.10H_2O$	13.82	9.37		
$Na_2CO_3.10H_2O$		6.63		14.15

NH_4^+ $C_2O_4^{--}$ Na^+ (314): $H_2O + (NH_4)_2C_2O_4 + Na_2C_2O_4$

Solid phases	Liquid phase t = 25°C % $(NH_4)_2C_2O_4$	% $Na_2C_2O_4$	t = 50°C % $(NH_4)_2C_2O_4$	% $Na_2C_2O_4$
$(NH_4)_2C_2O_4.H_2O$	5.01	0	9.63	0
	4.88	0.89	9.46	1.25
	4.81	1.82	9.32	2.45
	4.75	2.85	9.21	3.57
$(NH_4)_2C_2O_4.H_2O + Na_2C_2O_4$	4.74	3.41	9.19	4.05
$Na_2C_2O_4$	3.77	3.46	7.86	4.13
	2.48	3.50	6.12	4.29
	1.49	3.65	4.64	4.28
	0.74	3.69	1.59	4.46
	0	3.73	0	4.54

NH_4^+ $C_2O_4^{--}$ K^+ (314): $H_2O + (NH_4)_2C_2O_4 + K_2C_2O_4$

Solid phases	Liquid phase t = 25°C % $(NH_4)_2C_2O_4$	% $K_2C_2O_4$	t = 50°C % $(NH_4)_2C_2O_4$	% $K_2C_2O_4$
$(NH_4)_2C_2O_4.H_2O$	5.01	0	9.63	0
Solid soln. I*	4.72	2.67	8.40	7.99
	4.38	6.51	7.10	16.20
	4.16	9.48	6.79	17.99
	4.01	12.10	6.10	22.40
	3.68	15.37	5.75	24.40
	3.32	19.39	4.78	30.40
	3.10	21.91		
	2.90	24.30		
Solid soln. I* + Solid soln. II*	1.83	26.30	4.78	30.40
Solid soln. II*	0.85	26.80	3.34	31.0
$K_2C_2O_4.H_2O$	0	27.20	0	33.10

* Solid solns. I and II contain $K_2C_2O_4.H_2O$ and $(NH_4)_2C_2O_4.H_2O$.

NH_4^+ $C_4H_4O_6^{--}$ Na^+ (197)

$H_2O + (NH_4)_2C_4H_4O_6 + Na_2C_4H_4O_6$

°C	Solid phases	Liquid phase—M per 1000M H_2O* A†	B†
12.8	$NH_4NaC_4H_4O_6.4H_2O$ (*d* and *l*)	21.05	21.05
16.2		24.30	24.30
16.7		31.90	31.90
26.2		34.40	34.40
21	$NH_4NaC_4H_4O_6.4H_2O$ (*d* and *l*) + $(NH_4)_2C_4H_4O_6$ (*dl*)	22.7	36.4
21	$NH_4NaC_4H_4O_6.4H_2O$ (*d* and *l*) + $Na_2C_4H_4O_6$ (*dl*)	33.7	23.1
27	$NH_4NaC_4H_4O_6.4H_2O$ (*d* and *l*) + $NH_4NaC_4H_4O_6$ (*dl*)	38.6	38.6
35	$Na_2C_4H_4O_6$ (*dl*) + $(NH_4)_2C_4H_4O_6$ (*dl*)	33.80	44.40

* Includes data taken from other sources.

† A = $Na_2C_4H_4O_6$; B = $(NH_4)_2C_4H_4O_6$.

NH_4^+ CO_3^{--} (378)
$H_2O + NH_4OH + H_2CO_3$

Solid phases	Liquid phase							
	t = 0.1°C		t = 20°C		t = 40°C		t = 60°C	
	% NH_3	% CO_2	% NH_3	% CO_2	% NH_3	% CO_2	% NH_3	% CO_2
NH_4HCO_3	2.6	6.05	3.95	9.25	6.18	14.05	7.8	17.00
	8.8	12.1	9.25	13.9	10.2	17.0	14.1	21.80
	10.6	14.0	14.2	18.8	14.6	21.5	18.3	26.30
			16.0	20.4	17.7	24.8	22.8	32.00
$NH_4HCO_3 + 2NH_4HCO_3.(NH_4)_2CO_3.H_2O$	11.2	14.8	17.3*	21.9*				
$NH_4HCO_3 + NH_4CO_2NH_2$					21.0	28.2	23.7	32.30
$2NH_4HCO_3.(NH_4)_2CO_3.H_2O$	14.2	17.8	18.5	23.2				
$2NH_4HCO_3.(NH_4)_2CO_3.H_2O + (NH_4)_2CO_3$	14.35*	18.15*	20.2*	24.9*				
$NH_4HCO_3.NH_4CO_2NH_2$					22.3	28.9	25.6	33.6
					26.5	31.1	26.3	34.00
					28.1	32.3	28.6	34.90
$(NH_4)_2CO_3$	15.1	17.6	22.0	24.8				
	17.5	13.2	26.6	24.4				
	25.4	13.3	28.6	24.2				
	28.7	12.0						
$(NH_4)_2CO_3 + NH_4CO_2NH_2$	33.2	13.6	29.75*	23.9*				
$NH_4HCO_3.NH_4CO_2NH_2 + NH_4CO_2NH_2$					29.65	32.65		
$NH_4CO_2NH_2$	39.7	11.6	31.2	23.8	30.5	31.2	30.5	35.90
	45.0	11.2	33.5	22.9	33.2	27.2	31.6	24.00

* Average of several determinations.

NH_4^+ $C_2O_4^{--}$ UO_2^{++} (84)
$H_2O + (NH_4)_2C_2O_4 + UO_2C_2O_4$

Solid phases	Liquid phase					
	t = 15°C		t = 50°C		t = 75°C	
	% $UO_2C_2O_4$	% $(NH_4)_2C_2O_4$	% $UO_2C_2O_4$	% $(NH_4)_2C_2O_4$	% $UO_2C_2O_4$	% $(NH_4)_2C_2O_4$
$UO_2C_2O_4.3H_2O$	0.47	0.0	1.00	0.0		
$UO_2C_2O_4.3H_2O + (NH_4)_2C_2O_4.2UO_2C_2O_4.3H_2O$	7.19	2.14				
$UO_2C_2O_4.3H_2O + (NH_4)_2C_2O_4.2UO_2C_2O_4$			5.11	1.36		
$(NH_4)_2C_2O_4.2UO_2C_2O_4.3H_2O + (NH_4)_2C_2O_4.UO_2C_2O_4.2H_2O$	8.78	2.99				
$(NH_4)_2C_2O_4.2UO_2C_2O_4 + (NH_4)_2C_2O_4.UO_2C_2O_4$			19.89	8.52		
$2(NH_4)_2C_2O_4.UO_2C_2O_4$					28.56	18.70
					29.59	21.17
$(NH_4)_2C_2O_4.UO_2C_2O_4.2H_2O + (NH_4)_2C_2O_4.H_2O$	9.66	6.43				
$(NH_4)_2C_2O_4.UO_2C_2O_4 + (NH_4)_2C_2O_4$			23.82	15.90		
$(NH_4)_2C_2O_4.H_2O$	0.0	3.69	0.0	9.36		

NH_4^+ CrO_4^{--}
$H_2O + NH_4OH + H_2CrO_4$; *v.* Fig. 153

	Solid phases; t = 30°C (336)	Liquid phase	
		% $(NH_4)_2O$	% CrO_3
A	$(NH_4)_2O.CrO_3$	34.17	6.933
B		9.83	18.98
		9.74	22.53
D	$(NH_4)_2O.CrO_3 + (NH_4)_2O.2CrO_3$	10.50	27.09
	$(NH_4)_2O.2CrO_3$	7.80	25.99
F		6.64	25.43
G	$(NH_4)_2O.2CrO_3 + (NH_4)_2O.3CrO_3$	4.81	42.44
H	$(NH_4)_2O.3CrO_3 + (NH_4)_2O.4CrO_3$	1.58	54.56
I	$(NH_4)_2O.4CrO_3$	0.99	59.06
	$(NH_4)_2O.4CrO_3 + CrO_3$	0.61	63.60
	CrO_3		62.28

NH_4^+ $C_2O_4^{--}$ Sc^{+++}
$H_2O + (NH_4)_2C_2O_4 + Sc_2(C_2O_4)_3$; t = 25°C (397)

% C_2O_3	% Sc_2O_3
$Sc_2(C_2O_4)_3$	
1.624	0.3019
2.400	0.4012
4.478	0.7108

NH_4^+ Cu^+
$H_2O + NH_4OH + Cu_2O$
t = 25°C (106)

% NH_3	% Cu
CuO (prep. I)	
0.391	0.03593
1.207	0.05024
1.377	0.06869
1.615	0.06964
2.703	0.10144
3.264	0.10462

NH_4^+ Cu^+.—(*Continued*)

% NH_3	% Cu
CuO (prep. I)	
3.689	0.10557
4.573	0.12243
6.868	0.13229
7.412	0.14882
8.126	0.15105
9.852	0.16313
12.240	0.16981
CuO (prep. II)	
0.782	0.04229
0.816	0.06678
2.261	0.09890
2.839	0.10494
5.416	0.13528
7.208	0.15047
7.820	0.15963
10.205	0.16555

NH_4^+ CrO_4^{--} K^+

$H_2O + (NH_4)_2CrO_4 + K_2CrO_4$

$t = 25°C$ (10)

Solid phases	M % $(NH_4)_2CrO_4$	Liquid phase: % K_2CrO_4	Liquid phase: % $(NH_4)_2CrO_4$
K_2CrO_4	0.0	39.35	0.0
	0.45	36.77	1.41
	1.07	34.38	3.25
	2.77	29.36	6.75
Solid soln. I*	2.85	25.34	10.29
	4.86	21.34	13.70
	6.50	18.64	16.51
	12.18	16.07	19.10
Solid soln. I* + Solid soln. II*	33.35	15.84	19.95
	50.92	15.60	20.01
	81.65	14.66	20.30
	94.14	14.14	20.70
Solid soln. II*	94.99	11.69	21.30
	96.39	10.63	21.94
	98.13	7.08	22.88
	98.84	4.53	23.43
$(NH_4)_2CrO_4$	100.0	0.0	25.21

* Solid soln. I contains from 0 to 16.75M % $(NH_4)_2CrO_4$; Solid soln. II from 55.5 to 100 %.

NH_4^+ BO_3^{---}

$H_2O + NH_4OH + H_3BO_3$

$t = 30°C$ (323)

% $(NH_4)_2O$	% B_2O_3
H_3BO_3	
0.2345	4.0864
0.7023	7.2020
$H_3BO_3 + (NH_4)_2O.5B_2O_3.8H_2O$	
0.7810	7.62
$(NH_4)_2O.5BO_3.8H_2O$	
0.988	7.526
1.075	7.758
1.0825	7.6625
1.7064	9.1345
1.7585	9.275
2.0219	10.022
2.2465	10.709
2.4477	11.30
2.6649	11.858
2.89	12.315
2.945	12.79
3.125	12.59
$2(NH_4)_2O.4B_2O_3.5H_2O$	
3.4346	6.351
6.5096	4.481
10.45	3.366
17.367	2.093
18.055	2.019
19.233	1.976
24.80	1.508

NH_4^+ BO_3^{---}.—(*Continued*)

% $(NH_4)_2O$	% B_2O_3
$2(NH_4)_2O.4B_2O_3.5H_2O$	
25.29	1.432
30.56	1.217
34.225	0.908
43.846	0.8049
45.34	0.8448

NH_4^+ $B_4O_7^{--}$ Na^+; *v. below*

NH_4^+ AlO_2^-

$H_2O + NH_4OH + Al(OH)_3$

$t = 20°C$ (12)

M_{NH_4OH}/l	g $Al(OH)_3$/l
$Al(OH)_3.?H_2O$	
0.05	0.070
0.100	0.080
0.125	0.250
0.200	0.380
0.500	0.450
1.000	0.240

PO_4^{---} Zn^{++} (116)

$H_2O + H_3PO_4 + ZnO$

t = 25°C: % P_2O_5	t = 25°C: % ZnO	t = 37°C: % P_2O_5	t = 37°C: % ZnO
$P_2O_5.3ZnO.4H_2O$			
5.08	2.38	4.87	2.08
9.76	4.65	9.46	4.12
12.42	6.13	13.60	6.27

Continued on p. 369

NH_4^+ $B_4O_7^{--}$ Na^+ (330)

$H_2O + (NH_4)_2B_4O_7 + Na_2B_4O_7$; *v.* Fig. 154

Liquid phase—% A = % $(NH_4)_2B_4O_7$; % B = % $Na_2B_4O_7$

Solid phases	t = 0°C % A	t = 0°C % B	t = 10°C % A	t = 10°C % B	t = 16°C % A	t = 16°C % B	t = 20°C % A	t = 20°C % B	t = 25°C % A	t = 25°C % B	t = 35°C % A	t = 35°C % B
		1.10		1.60		2.13		2.52		3.09		4.83
$Na_2B_4O_7.10H_2O$			1.20	1.37					8.16*	3.04*	3.29*	4.63*
			4.33	1.24					8.77*	3.07*	9.81*	5.12*
$Na_2B_4O_7.10H_2O + (NH_4)_2B_4O_7.4H_2O$	3.22	0.85	4.91	1.24	6.60	1.83	7.73	2.22	9.27*	3.07*	13.42*	5.54*
$(NH_4)_2B_4O_7.4H_2O$			4.96	0.93	6.61		7.64		9.26	2.77	13.27*	3.42*
	3.76		5.26						9.00		13.02*	

Liquid phase—% A = % $(NH_4)_2B_4O_7$; % B = % $Na_2B_4O_7$

Solid phases	t = 45°C % A	t = 45°C % B	t = 50.5°C % A	t = 50.5°C % B	t = 55°C % A	t = 55°C % B	t = 57°C % A	t = 57°C % B	t = 65°C % A	t = 65°C % B
		7.49		9.76		12.37		13.90		
$Na_2B_4O_7.10H_2O$	10.79	8.76	18.18	13.31	12.44	15.60	11.07	16.29		
$Na_2B_4O_7.10H_2O + (NH_4)_2B_4O_7.4H_2O$	18.62*	9.99*								
$Na_2B_4O_7.10H_2O + Na_2B_4O_7.5H_2O$			21.10*	13.74*	19.30*	17.29*	14.28*	17.25*		
$Na_2B_4O_7.5H_2O$					21.34	17.35	15.88	17.27		17.95
									10.70	18.70
$Na_2B_4O_7.5H_2O + (NH_4)_2B_4O_7.4H_2O$			21.16	13.82	23.48*	17.47*	24.65	17.60	28.94*	19.36*
$(NH_4)_2B_4O_7.4H_2O$	18.41		21.21	12.30	23.69		25.10		28.94	18.56
			21.20						30.80	

Invariant points		% A	% B
−0.45°C	$Na_2B_4O_7.10H_2O$ + Ice		1.09
−1.07	$(NH_4)_2B_4O_7.4H_2O$ + Ice	3.62	
−1.22	$Na_2B_4O_7.10H_2O + (NH_4)_2B_4O_7.4H_2O$ + Ice	3.47	0.64

* Mean of more than one determination.

PO_4^{---} Zn^{++}.—(*Continued from p. 368*)

t = 25°C % P_2O_5	t = 25°C % ZnO	t = 37°C % P_2O_5	t = 37°C % ZnO
$P_2O_5.3ZnO.4H_2O$			
14.00	6.74	18.13	8.78
14.37	6.97	19.48	9.66
$P_2O_5.3ZnO.4H_2O + P_2O_5.2ZnO.7H_2O$			
15.20	7.50	20.30	10.10
$P_2O_5.2ZnO.7H_2O$			
15.98	7.71	21.96	10.88
18.33	8.73	26.75	13.26
22.75	10.74	29.65	14.77
26.48	12.47	33.39	17.06
30.09	14.16		
33.79	15.82		
37.76	17.65		
$P_2O_5.2ZnO.7H_2O + P_2O_5.2ZnO.3H_2O$			
40.00	18.80	34 *ca.*	
$P_2O_5.2ZnO.3H_2O$			
42.05	16.14	34.58	17.92
44.53	13.20	36.13	16.00
48.70	9.58	39.93	16.12
52.25	7.64	44.89	17.83
55.97	7.23	46.41	14.74
		51.35	11.26
		54.32	10.82

PO_4^{---} Pb^{++}

$H_2O + H_3PO_4 + PbO$

t = 25°C (121)

% P_2O_5	% PbO
$2PbO.P_2O_5.H_2O$	
5.09	0.134
9.91	0.228
14.43	0.329
18.84	0.510
22.91	0.690
26.74	0.777
31.00	0.792
34.82	0.903
39.96	1.088
45.74	1.480

PO_4^{---} Pb^{++}.—(*Continued*)

% P_2O_5	% PbO
$PbO.P_2O_5.2H_2O$	
50.73	1.299
53.06	0.999
54.89	0.756
58.53	0.473

PO_4^{---} Fe^{++}

$H_2O + H_3PO_4 + FeO$

t = 70°C (71)

% FeO	% P_2O_5
$2FeO.P_2O_5.5H_2O$	
2.76	7.38
4.38	12.06
5.53	14.46
5.48	14.96
5.54	15.10
$2FeO.P_2O_5.3H_2O$*	
1.31	7.71
1.39	9.18
1.43	9.88
1.53	10.99
1.60	11.25
$2FeO.P_2O_5.3H_2O$†	
1.42	10.10
1.45	10.60
1.55	11.50
1.60	11.90
$FeO.P_2O_5.4H_2O$	
1.58	10.50
1.60	8.77
1.61	6.29
1.63	4.87
1.71	3.15

* Crystalline. † Amorphous.

PO_4^{---} Fe^{+++}

$H_2O + H_3PO_4 + Fe_2O_3$

t = 25°C (70)

% Fe_2O_3	% P_2O_5
$Fe_2O_3.P_2O_5.5H_2O$*	
Tr.	5.93
0.23	10.10
1.40	14.10
2.43	19.80
4.42	21.70

PO_4^{---} Fe^{+++}.—(*Continued*)

t = 70°C; *v.* Fig. 155 (70)

	Solid phases	Liquid phase % Fe_2O_3	Liquid phase % P_2O_5
A	$Fe_2O_3.P_2O_5.5H_2O$	Tr.	4.07
B	$Fe_2O_3.P_2O_5.5H_2O$	1.08	23.56
C	$Fe_2O_3.P_2O_5.5H_2O$	5.45	37.43
D	$Fe_2O_3.2P_2O_5.8H_2O$	7.12	43.92
E	$Fe_2O_3.2P_2O_5.8H_2O$	8.10	52.32
	$Fe_2O_3.3P_2O_5.10H_2O$	9.79	53.20
G	$Fe_2O_3.3P_2O_5.10H_2O$	8.68	55.84
H	$Fe_2O_3.3P_2O_5.6H_2O$	5.28	58.07
I	$Fe_2O_3.3P_2O_5.6H_2O$	3.46	60.47

* Graphical representation of the above data indicates that the solid phase is $Fe_2O_3.P_2O_5.5H_2O$. From solutions containing less P_2O_5, unknown hydrates of the same salt were obtained. These hydrates were found to adsorb P_2O_5 and the variable proportions of Fe_2O_3 and P_2O_5 found in the solid phases obtained by Cameron and Bell (58) are probably due to adsorption. The pentahydrate is not able to adsorb these substances.

PO_4^{---} Mg^{++}: $H_2O + H_3PO_4 + MgO$

t = 25°C (58)

% MgO	% P_2O_5	% MgO	% P_2O_5
$MgHPO_4.3H_2O$		$MgHPO_4.3H_2O$	
0.221	0.731	9.204	39.079
1.074	3.703	$MgH_4(PO_4)_2.xH_2O$	
3.269	11.425	0.5357	47.946
5.876	21.930	0.4268	50.490
8.340	33.904		

PO_4^{---} Ca^{++}; *v.* p. 370

PO_4^{---} Na^+ (99): $H_2O + H_3PO_4 + NaOH$; *v.* Fig. 157

	Solid phases	Liquid phase, 25°C % P_2O_5	Liquid phase, 25°C % Na_2O
A	$P_2O_5.3Na_2O.24H_2O$	0.29	13.26
	$P_2O_5.3Na_2O.24H_2O$	1.30	10.04
B	$P_2O_5.3Na_2O.24H_2O$	5.34	6.95
	$P_2O_5.3Na_2O.24H_2O$	7.67	8.46
C	$P_2O_5.3Na_2O.24H_2O + P_2O_5.2Na_2O.25H_2O$	9.45	10.79
D	$P_2O_5.2Na_2O.25H_2O$	5.54	4.84
	$P_2O_5.2Na_2O.25H_2O$	11.36	7.38
	$P_2O_5.2Na_2O.25H_2O$	25.21	14.42
E	$P_2O_5.2Na_2O.25H_2O + P_2O_5.2Na_2O.15H_2O$	27.49	17.45
	$P_2O_5.2Na_2O.15H_2O$	32.88	19.56
F	$P_2O_5.2Na_2O.15H_2O + P_2O_5.2Na_2O.5H_2O$	34.66	20.96
	$P_2O_5.2Na_2O.5H_2O$	33.17	18.63
G	$P_2O_5.2Na_2O.5H_2O$	28.62	12.59
	$P_2O_5.2Na_2O.5H_2O$	31.11	12.99
H	$P_2O_5.2Na_2O.5H_2O$	41.83	14.42
	$P_2O_5.2Na_2O.5H_2O$	45.45	15.13

Transition points

$Na_3PO_4.12H_2O \leftrightarrow$? at 70.75 ± 0.1°C.

$Na_2HPO_4.12H_2O \leftrightarrow Na_2HPO_4.7H_2O$ + Solution at 35.4 ± 0.05°C

$Na_2HPO_4.7H_2O \leftrightarrow Na_2HPO_4.2H_2O$ + Solution at 48.35 ± 0.05°C.

Hammick and Goodby (160) report the following:

$Na_2HPO_4.12H_2O\alpha \leftrightarrow Na_2HPO_4.12H_2O\beta$ at 29.6°C.

$Na_2HPO_4.12H_2O\alpha \leftrightarrow Na_2HPO_4.7H_2O$ + Solution at 35°C.

$Na_2HPO_4.12H_2O\beta \leftrightarrow$ Ice + Solution at −47°C.

$Na_2HPO_4.7H_2O \leftrightarrow Na_2HPO_4.2H_2O$ + Solution at 48°C.

$Na_2HPO_4.2H_2O \leftrightarrow Na_2HPO_4$ + Solution at 95.2°C.

PO_4^{---} K^+ (99, 294)

$H_2O + H_3PO_4 + KOH$; *v.* Fig. 158

	Solid phases	Liquid phase, 25°C % P_2O_5	Liquid phase, 25°C % K_2O
A	$3K_2O.P_2O_5.6H_2O$	1.63*	46.10*
	$3K_2O.P_2O_5.6H_2O$	3.41*	43.28*
B	$3K_2O.P_2O_5.6H_2O$	14.70*	33.63*
C	$3K_2O.P_2O_5.6H_2O$	20.74*	41.49*
D	$3K_2O.P_2O_5$	22.23	43.05
	$3K_2O.P_2O_5$	29.33	32.45
E	$3K_2O.P_2O_5$	27.84*	32.02*
F	$2K_2O.P_2O_5.H_2O$	23.08	24.68
G	$2K_2O.P_2O_5.H_2O$	20.88	20.82
H	$2K_2O.P_2O_5.H_2O$	12.15	8.00
I	$2K_2O.P_2O_5.H_2O + K_2O.P_2O_5.2H_2O$	10.37*	6.88*
	$2K_2O.P_2O_5.H_2O + K_2O.P_2O_5.2H_2O$	10.51	6.87
J	$K_2O.P_2O_5.2H_2O$	22.37	8.38
K	$K_2O.P_2O_5.2H_2O$	62.50	15.64
L	$K_2O.2P_2O_5.5H_2O$	60.80*	6.59*
M	$K_2O.2P_2O_5.5H_2O$	47.87*	6.92*

* Results of Parker (294).

PO_4^{---} Ca^{++} (24): $H_2O + H_3PO_4 + CaO$; *v.* Fig. 156

Solid phases	Liquid phase*					
	t = 25°C*		t = 40°C		t = 50.7°C	
	% P_2O_5	% CaO	% P_2O_5	% CaO	% P_2O_5	% CaO
$CaO.P_2O_5.2H_2O + CaO.P_2O_5.3H_2O$					62.01	0.336
$CaO.P_2O_5.3H_2O$	36.11	3.088	45.42	1.768	58.08	0.635
$CaO.P_2O_5.3H_2O + CaHPO_4$	24.20	5.80	27.25	5.755	29.61	5.725
$CaHPO_4 + CaHPO_4.2H_2O$	0.417	0.165				
$CaHPO_4.2H_2O + 3CaO.P_2O_5.H_2O$	0.140	0.051				
$CaHPO_4 + 3CaO.P_2O_5.H_2O$			0.140	0.0515	0.1435	0.0565
$3CaO.P_2O_5.H_2O + 4CaO.P_2O_5.4H_2O$	0.0015	0.0034	0.000650	0.00065	0.0006	0.0006
$4CaO.P_2O_5.4H_2O + CaO.H_2O$	0	0.1131				
$CaO.H_2O$	0	0.118		0.102		0.0953

* These data are in fair agreement with the results of Cameron and Bell (57).

$H_2PO_4^-$ $H_2AsO_4^-$ K^+

$H_2O + KH_2PO_4 + KH_2AsO_4$; *v.* Fig. 159

t = 6.8 − 7.2°C (277)

Solid phase—Solid soln., Wt. % KH_2AsO_4	Liquid phase	
	% KH_2PO_4	% KH_2AsO_4
	21.48	
11.19	18.77	3.20
18.42	17.40	5.08
27.08	15.28	7.78
36.46	13.46	10.15
46.49	11.50	12.64
56.96	9.28	14.97
67.75	6.74	17.14
77.63	4.26	19.50
88.19	2.43	21.33
100		23.62

AsO_2^- Li^+

$H_2O + H_3AsO_3 + LiOH$

t = 25°C (355)

% As_2O_3	% Li_2O
As_2O_3	
2.02	0
6.46	0.45
$As_2O_3.Li_2O$	
10.26	0.84
4.19	2.26
6.32	5.36
$As_2O_3.Li_2O + Li_2O.3H_2O$	
7.50	7.63
$Li_2O.3H_2O$	
3.81	7.81
0	7.15

AsO_2^- Na^+

$H_2O + H_3AsO_3 + NaOH$

t = 25°C (354)

% As_2O_3	% Na_2O
As_2O_3	
2.019	0
14.45	2.45
24.42	4.23
37.73	6.46
58.54	9.60
$As_2O_3 + As_2O_3.Na_2O$	
73.0 *ca.*	12.0 *ca.*
$As_2O_3.Na_2O$	
63.01	12.73
60.46	13.06
57.90	13.24

AsO_2^- Na^+.—(*Continued*)

% As_2O_3	% Na_2O
$As_2O_3.Na_2O$	
53.48	13.73
48.05	14.27
40.61	16.24
36.32	18.74
35.17	20.68
34.83	21.06
$As_2O_3.Na_2O + As_2O_3.2Na_2O.9H_2O$	
34.0 *ca.*	21.1 *ca.*
$As_2O_3.2Na_2O.9H_2O$	
32.24	21.60
31.05	21.82
29.54	22.68
$As_2O_3.2Na_2O.9H_2O + 2As_2O_3.5Na_2O.26H_2O$	
29.0 *ca.*	22.7 *ca.*
$2As_2O_3.5Na_2O.26H_2O$	
27.34	22.73
21.92	24.04
20.73	24.49
17.50	25.64
14.44	28.18
14.63	30.24
16.61	31.37
$2As_2O_3.5Na_2O.26H_2O + As_2O_3.2Na_2O$	
19.32	32.04
$As_2O_3.2Na_2O$	
15.53	33.57
10.49	36.67

AsO_2^- Na^+.—(*Continued*)

% As_2O_3	% Na_2O
$As_2O_3.2Na_2O$	
7.96	37.91
6.35	39.54
$As_2O_3.2Na_2O + NaOH.H_2O$	
6.59	39.39
$NaOH.H_2O$	
5.11	39.69
0.0	41.20*

* By interpolation from earlier work.

AsO_2^- K^+

$H_2O + H_3AsO_3 + KOH$

t = 25°C (355)

% As_2O_3	% K_2O
As_2O_3	
2.02	0
22.63	5.61
36.29	8.78
54.02	11.62
$2As_2O_3.K_2O$	
58.11	13.74
49.02	20.19
$2As_2O_3.3K_2O.12H_2O$	
48.96	24.16
39.49	23.49
20.98	32.93
29.61	38.32
$K_2O.3H_2O$	
23.82	42.48
$K_2O.5H_2O$	
11.53	44.13
0	45.50

AsO_4^{---} Ca^{++}

$H_2O + H_3AsO_4 + Ca_3(AsO_4)_2$

t = 35°C (362); *v.* Fig. 160

% As_2O_5	% CaO
$As_2O_5.2CaO.5H_2O$	
0.198	0.096
2.711	0.702
7.98	1.903
12.97	3.206
18.70	4.59
19.99	4.64
21.97	5.34
$As_2O_5.CaO.2H_2O$	
28.78	6.54
35.03	5.34

AsO_4^{---} Ca^{++}.—(*Continued*)

% As_2O_5	% CaO
$As_2O_5.CaO.2H_2O$	
43.43	4.07
50.30	2.95
55.43	1.87
62.66	0.822
71.04	0.135
72.14	0.114

AsO_4^{---} Ba^{++}

$H_2O + H_3AsO_4 + BaO$

t = 30°C (173)

% BaO	% As_2O_5
$BaHAsO_4.H_2O + Ba_3(AsO_4)_2.xH_2O$	
0.025	0.030
$BaHAsO_4.H_2O$	
2.63	3.98
4.36	7.26
5.49	9.28
6.62	11.27
9.46	14.92
11.67	18.52
13.59	22.95
$BaHAsO_4.H_2O + BaH_4(AsO_4)_2.2H_2O$	
16.65	28.01
$BaH_4(AsO_4)_2.2H_2O$	
13.70	35.10
7.53	47.27
6.56	48.48
$BaH_4(AsO_4)_2.2H_2O + 3As_2O_5.5H_2O$	
Tr.	72.04

BiO^+ CrO_4^{--}

$H_2O + Bi(OH)_3 + H_2CrO_4$

t = 25°C (90)

$M_{Bi_2O_3}$/l	M_{CrO_3}/l
$CrO_3 + Bi_2O_3.4CrO_3$	
0.1	11.17
$Bi_2O_3.4CrO_3$	
0.04	7.92
$Bi_2O_3.4CrO_3 + Bi_2O_3.2CrO_3$	
0.04	7.80
$Bi_2O_3.2CrO_3$	
M_{CrO_3}/l	M_{CrO_3}/l
7.22	0.119
4.666	0.013
1.470	0.0002
0.535	

CO_3^{--} HCO_3^- Na^+ (141, 251): $H_2O + Na_2CO_3 + NaHCO_3$; *v.* Fig. 161

Solid phases	Liquid phase (141) t = 0°C % Na_2CO_3	t = 0°C % $NaHCO_3$	t = 15°C % Na_2CO_3	t = 15°C % $NaHCO_3$	t = 20°C % Na_2CO_3	t = 20°C % $NaHCO_3$	t = 25°C % Na_2CO_3	t = 25°C % $NaHCO_3$	t = 30°C % Na_2CO_3	t = 30°C % $NaHCO_3$	t = 35°C % Na_2CO_3	t = 35°C % $NaHCO_3$	t = 45°C % Na_2CO_3	t = 45°C % $NaHCO_3$	t = 60°C % Na_2CO_3	t = 60°C % $NaHCO_3$
$NaHCO_3$	0.0	6.5	0.0	8.1	0.0	8.7	0.0	9.3	0.0	9.9	0.0	10.6	0.0	12.0		
	4.0	5.1	6.0	6.0	3.5	7.2	6.1	4.9	0.8	9.1	9.7	6.9	0.8	11.3	1.4	2.9
					6.3	6.5	10.0	3.9	9.7	6.3			8.7	8.0	8.5	10.1
							16.7	3.3	17.5	4.6						
$NaHCO_3 + NaHCO_3.Na_2CO_3.2H_2O$							17.9*	4.05*	17.6	4.3	17.3	4.7	16.9	5.9	16.9	7.4
$NaHCO_3.Na_2CO_3.2H_2O$									18.3	3.8	23.7	2.0	21.4	3.0	25.8	2.4
							20.8	2.5	26.1	1.2	28.7	0.9	27.3	1.3		
									26.5	1.1						
$NaHCO_3.Na_2CO_3.2H_2O + Na_2CO_3.10H_2O$							22.6	1.5	27.1	1.3			31.7	0.9	30.7	1.3
$NaHCO_3 + Na_2CO_3.10H_2O$	5.6	4.6	13.3	4.3	17.05*	4.0*										
$Na_2CO_3.10H_2O$	5.9	1.4	13.8	1.8	17.3	2.9	22.7	0.0	27.5	0.8						
	6 4	0.0	14.1	0.0	18.0				28.45	0.0						
$Na_2CO_3.NaHCO_3.2H_2O + Na_2CO_3.7H_2O$											32.5	0.6				
$Na_2CO_3.7H_2O$											32.8	0.3				
											32.9	0.0				
$Na_2CO_3.H_2O$													32.2	0.0	31.8	0.0

Transition temperatures (141)

$Na_2CO_3.10H_2O + NaHCO_3 + Na_2CO_3.NaHCO_3.2H_2O$ = 19.7°C.
$Na_2CO_3.10H_2O + Na_2CO_3.7H_2O + Na_2CO_3.NaHCO_3.2H_2O$ = 31°C.
$Na_2CO_3.7H_2O + Na_2CO_3.H_2O + Na_2CO_3.NaHCO_3.2H_2O$ = 34.5°C.

Solid phases	Liquid phase, t = 25°C (251) g $NaHCO_3$/l	g Na_2CO_3/l
$NaHCO_3$	98.7	0
$NaHCO_3 + Na_2CO_3.NaHCO_3.2H_2O$	50.8	216.6
$Na_2CO_3.NaHCO_3.2H_2O + Na_2CO_3.10H_2O$	27.6	276.3
$Na_2CO_3.10H_2O$	0	276.4

* Average of two results.

BiO^+ Na^+ (274)

$H_2O + Bi(OH)_3 + NaOH$

t = 20°C g NaOH/l	t = 20°C g Bi/l	t = 100°C g NaOH/l	t = 100°C g Bi/l
$Bi(OH)_3 + BiO.OH$*			
20			
40	Tr.	20	0.15
80	0.04	40	0.20
160	0.07	80	0.35
120	0.08	160	0.50
200	0.10	200	0.50
240	0.11	320	1.20
320	0.11	400	1.70
400	0.16		

* Composition of solid phases not verified; at higher concentrations of NaOH mainly BiO.OH.

BiO^+ K^+ (274)

$H_2O + Bi(OH)_3 + KOH$

t = 20°C g KOH/l	t = 20°C g Bi/l	t = 100°C g KOH/l	t = 100°C g Bi/l
$Bi(OH)_3 + BiO.OH$*			
28		28	0.15
56	Tr.	56	0.20

BiO^+ K^+.—(*Continued*)

t = 20°C g KOH/l	t = 20°C g Bi/l	t = 100°C g KOH/l	t = 100°C g Bi/l
$Bi(OH)_3 + BiO.OH$*			
112	0.03	112	0.30
168	0.06	224	0.50
224	0.08	280	0.50
280	0.10	448	1.20
336	0.11	560	1.65
448	0.11		
560	0.14		

* Composition of solid phases not verified; at higher concentrations of KOH mainly BiO.OH.

CO_3^{--} HCO_3^- Cu^{++} Na^+

$H_2O + CuCO_3 + Na_2CO_3 + NaHCO_3$; t = 18°C (7)

g Cu/l	g Na_2CO_3/l	g $NaHCO_3$/l
$Na_2CO_3.CuCO_3.3H_2O + NaHCO_3$		
0	9.27	87.79
0.0509	11.08	86.45
0.0542	13.44	85.27
0.0870	62.36	72.65

CO_3^{--} HCO_3^- Cu^{++} Na^+.—(*Continued*)

g Cu/l	g Na_2CO_3/l	g $NaHCO_3$/l
$Na_2CO_3.CuCO_3.3H_2O + NaHCO_3$		
0.1061	99.30	64.10
0.1411	152.63	56.24
0.1553	168.75	53.60
$Na_2CO_3.CuCO_3.3H_2O + NaHCO_3 + Na_2CO_3.10H_2O$		
	185.02	53.77

CO_3^{--} HCO_3^- Cu^{++} Na^+.—(*Continued*)

g Cu/l	g Na_2CO_3/l	g $NaHCO_3$/l
$Na_2CO_3.CuCO_3.3H_2O + Na_2CO_3.10H_2O$		
	193.13	17.64
	195.57	7.48
0.257	197.08	18.94

CO_3^{--} HCO_3^- K^+ (404)

$H_2O + K_2CO_3 + KHCO_3$

CO_3^{--} Pb^{++} CrO_4^{--} K^+ (150)

$H_2O + PbCO_3 + K_2CrO_4$

Solid phases	Liquid phase—M per 1000M H_2O, t = 25°C $0.5K_2CO_3$	t = 25°C $0.5K_2CrO_4$	t = 25°C $0.5PbCO_3$	t = 40°C $0.5K_2CO_3$	t = 40°C $0.5K_2CrO_4$	t = 40°C $0.5PbCO_3$
$K_2CrO_4 + PbCrO_4$		121.4			129.154	
$K_2CrO_4 + PbCrO_4 + K_2CO_3$	236.8	3.388	0.859	243.0	4.070	1.438
$PbCO_3 + PbCrO_4 + K_2CO_3$	242.72	2.052	1.603	245.28	3.332	1.706
$PbCO_3 + K_2CO_3$*	259.74		2.010	269.22		2.470
$PbCO_3 + PbCrO_4$	1.690	0.309		1.546	0.454	
	7.475	0.524		7.152	0.848	
	19.222	0.778		18.800	1.201	

* Some evidence of a double carbonate or solid solution.

CO_3^{--} MnO_4^- K^+ (319)

$H_2O + K_2CO_3 + KMnO_4$

Solid phase	Liquid phase—M per liter					
	t = 0°C		t = 25°C		= 40°C	
	K_2CO_3	$KMnO_4$	K_2CO_3	$KMnO_4$	K_2CO_3	$KMnO_4$
$KMnO_4$	0.05	0.1462	0.05	0.4375	0.05	0.7380
	0.5	0.0629	0.5	0.2589	0.5	0.5007
	1	0.0446			1	0.3519
	2	0.027	2	0.093		
	3	0.0156				

CO_3^{--} Zn^{++} Na^+ (411)

$H_2O + ZnO + Zn(OH)_2 + Na_2ZnO_2 + Na_2CO_3$

CO_3^{--} Mg^{++} Na^+

$H_2O + MgCO_3 + Na_2CO_3$

t = 25°C (69)

g $MgCO_3$/l	g Na_2CO_3/l
?*	
0.223	0
0.288	23.12
0.510	50.75
0.879	86.42
1.314	127.30
1.636	160.80
1.972	181.90
2.317	213.20

* Solid phase not examined after saturation.

CO_3^{--} Na^+; CO_3^{--} Na^+ K^-; *v.* p. 373

CO_3^{--} K^+

$H_2O + KOH + K_2CO_3$

t = 30°C (390)

% KOH	% K_2CO_3
$KOH.2H_2O$	
55.75	0
$KOH.2H_2O + K_2CO_3.\frac{3}{2}H_2O$	
55.14	2.05
$K_2CO_3.\frac{3}{2}H_2O$	
53.77	2.50
0	53.27

$C_2O_4^{--}$ Hg^{++} K^+

$H_2O + HgC_2O_4 + K_2C_2O_4$

t = 20°C (385)

% $K_2C_2O_4$	% HgC_2O_4
$K_2C_2O_4.H_2O$	
34.93	0.0
35.08	0.16

$C_2O_4^{--}$ Hg^{++} K^+.—(*Cont'd*)

% $K_2C_2O_4$	% HgC_2O_4
$K_2C_2O_4.H_2O + 3K_2C_2O_4.HgC_2O_4.4H_2O$	
35.36	0.36
$3K_2C_2O_4.HgC_2O_4.4H_2O$	
35.34	0.43
$3K_2C_2O_4.HgC_2O_4.4H_2O + 2K_2C_2O_4.HgC_2O_4.3H_2O$	
35.33	0.46
$2K_2C_2O_4.HgC_2O_4.3H_2O + K_2C_2O_4.HgC_2O_4.2H_2O$	
35.23	0.41
$K_2C_2O_4.HgC_2O_4.2H_2O$	
34.20	0.36
31.89	0.33
29.88	0.33
26.10	0.29
21.89	0.26
19.98	0.23
16.58	0.22
$K_2C_2O_4.HgC_2O_4.2H_2O + HgC_2O_4$	
15.21	0.24
HgC_2O_4	
13.50	0.20
10.01	0.10
6.52	0.06
3.85	0.02
1.58	0.01
0.0	0.01

$C_2O_4^{--}$ Y^{+++} K^+

$H_2O + Y_2(C_2O_4)_3 + K_2C_2O_4$

t = 25°C (302)

% $K_2C_2O_4$	% $Y_2(C_2O_4)_3$
$K_2C_2O_4$	
27.47	0
27.72	0.78
27.84	0.97

$C_2O_4^{--}$ Y^{+++} K^+.—(*Cont'd*)

% $K_2C_2O_4$	% $Y_2(C_2O_4)_3$
$4K_2C_2O_4.Y_2(C_2O_4)_3.12H_2O$	
27.08	1.06
25.09	1.11
24.44	1.11
22.00	1.14
$Y_2(C_2O_4)_3$	
21.28	1.16
20.43	1.08
16.76	0.59
12.63	0.24
8.15	0.06
5.03	0.02
3.23	0.01
1.29	0.0

$C_2O_4^{--}$ Be^{++} (= Gl^{++})

$H_2O + H_2C_2O_4 + BeO + BeC_2O_4$; t = 25°C (361.5)

Gives data for solubility of $BeC_2O_4.3H_2O$ in solutions containing varying concentrations

$C_2O_4^{--}$ Be^{++}.—(*Cont'd*)

of BeO and of $H_2C_2O_4.2H_2O$ and solid solutions composed of $H_2C_2O_4.2H_2O$ and $BeC_2O_4.3H_2O$ in solutions containing BeC_2O_4 and $H_2C_2O_4$.

$C_2O_4^{--}$ Na^+ K^+

$H_2O + Na_2C_2O_4 + K_2C_2O_4$

t = 25°C (314)

% $K_2C_2O_4$	% $Na_2C_2O_4$
$K_2C_2O_4.H_2O$	
27.2	0
26.3	1.71
$K_2C_2O_4.H_2O + Na_2C_2O_4$	
26.1	2.50
$Na_2C_2O_4$	
19.6	3.21
14.4	3.21
8.10	3.40
3.99	3.71
0	3.71

$C_2O_4^{--}$ Fe^{++} Fe^{+++} K^+

$H_2O + FeC_2O_4 + Fe_2(C_2O_4)_3 + K_2C_2O_4$

t = 25°C (333)

Solid phases	Liquid phase		
	$M_{K_2C_2O_4}$/l	$M_{FeC_2O_4}$/l	$M_{K_3Fe(C_2O_4)_3}$/l
$K_2C_2O_4$	2.092		
$K_2C_2O_4 + K_2C_2O_4.FeC_2O_4$	2.250	0.600	
$FeC_2O_4 + K_2C_2O_4.FeC_2O_4$	1.418	0.456	
FeC_2O_4	1.414	0.312	
	0.922	0.239	
	0.457	0.070	
	0.268	0.026	
$K_3Fe(C_2O_4)_3$			0.299
$K_3Fe(C_2O_4)_3 + K_2C_2O_4$	1.936		0.063
$K_3Fe(C_2O_4)_3 + FeC_2O_4$		0.005	0.299
$K_2C_2O_4 + K_2C_2O_4.FeC_2O_4 + K_3Fe(C_2O_4)_3$	1.88	0.54	0.095
$FeC_2O_4 + K_2C_2O_4.FeC_2O_4 + K_3Fe(C_2O_4)_3$	1.43	0.45	0.140

$C_2O_4^{--}$ UO_2^{++} Na^+ (83)

$H_2O + UO_2C_2O_4 + Na_2C_2O_4$

Solid phases	Liquid phase			
	t = 15°C		t = 50°C	
	% $UO_2C_2O_4$	% $Na_2C_2O_4$	% $UO_2C_2O_4$	% $Na_2C_2O_4$
$UO_2C_2O_4.3H_2O$	0.47	0.0	1.00	0.0
$UO_2C_2O_4.3H_2O + Na_2C_2O_4.4UO_2C_2O_4.11H_2O$	2.65	0.80	3.58	1.01
$Na_2C_2O_4.4UO_2C_2O_4.11H_2O + Na_2C_2O_4.UO_2C_2O_4.5H_2O$	5.01	1.80		
$Na_2C_2O_4.4UO_2C_2O_4.11H_2O + Na_2C_2O_4.2UO_2C_2O_4.5H_2O$			9.84	3.60
$Na_2C_2O_4.2UO_2C_2O_4.5H_2O + Na_2C_2O_4.UO_2C_2O_4.5H_2O$			12.33	4.62
$Na_2C_2O_4.UO_2C_2O_4.5H_2O + Na_2C_2O_4$	3.14	4.93	13.69	9.03
$Na_2C_2O_4$	0.0	3.09	0.0	4.28

CO_3^{--} Na^+ (141)

$H_2O + NaOH + Na_2CO_3$; *v.* Fig. 162

Solid phases	Liquid phase															
	t = 0°C		t = 15°C		t = 20°C		t = 25°C		t = 30°C		t = 35°C		t = 45°C		t = 60°C	
	% Na_2CO_3	% NaOH	% Na_2CO_3	% NaOH	% Na_2CO_3	% NaOH	% Na_2CO_3	% NaOH	% Na_2CO_3	% NaOH	% Na_2CO_3	% NaOH	% Na_2CO_3	% NaOH	% Na_2CO_3	% NaOH
$Na_2CO_3.10H_2O$	6.4	0.0	14.1	0.0	18.0	0.0	22.7	0.0	28.4	0.0						
	2.6	8.1	10.1	4.8	12.9	6.3	18.2	5.4	26.5	3.1						
	2.2	18.4	7.5	13.8	11.6	12.7	18.1	7.0								
	2.7	20.9														
$Na_2CO_3.10H_2O + Na_2CO_3.7H_2O$	3.1	22.3	8.9	17.0	12.4	13.4	18.0	9.3	26.7	3.5						
$Na_2CO_3.7H_2O$			7.7	19.3	11.7	14.7	17.6	9.7	25.7	4.0	32.9	0.0				
							16.7	10.7	24.3	5.5						
$Na_2CO_3.7H_2O + Na_2CO_3.H_2O$	3.1	23.0	7.9	19.4	11.1	16.2	15.4	12.7	21.9	7.9	32.0	0.6				
$Na_2CO_3.H_2O$	1.2	28.9	6.3	20.8	5.2	22.0	1.2	30.6	19.0	9.8	25.3	4.9	32.2	0.0	31.8	0.0
			4.1	23.9	1.1	29.3	0.5	37.5	13.7	13.8	15.2	11.9	14.5	12.1	22.5	6.1
			1.2	30.6	0.3	39.8			0.9	31.2	7.5	18.7	1.4	28.1	14.2	12.2
			0.2	44.9							1.9	27.5	0.5	37.8	6.9	19.4
											0.5	34.2			1.1	32.6
$Na_2CO_3.H_2O + Na_2CO_3$			0.6	47.3	0.3	41.5	0.5	42.5	15.1*	35.0	0.5	39.2	0.5	38.3	0.8	34.4
Na_2CO_3			0.7	49.8	5.4*	43.9	4.5*	47.1	2.5*	44.5	0.2	39.5	0.5	47.0	0.7	35.4
					9.6*	43.8			6.1*	49.1	0.2	44.8	0.2	52.4	0.3	42.3
											0.2	50.2			0.3	52.2
$NaOH.4H_2O$	0.0	29.6														
$NaOH.H_2O$			0.0	51.2	0.0	52.1	0.0	53.3	0.0	54.3	0.0	55.4	0.0	57.8	0.0	63.5

* Solution not clear.

CO_3^{--} Na^+ K^+ (37, 214, 238, 288); for more recent data on the system, *v.* (184.5)

$H_2O + Na_2CO_3 + K_2CO_3$

Solid phases	Liquid phase											
	t = −6°C (214)		t = 10°C (238)		t = 24.2°C (238)		t = 40°C (214)		t = 25°C (37)		t = 25°C (288)	
	% K_2CO_3	% Na_2CO_3	% K_2CO_3	% Na_2CO_3	% K_2CO_3	% Na_2CO_3	% K_2CO_3	% Na_2CO_3	% K_2CO_3	% Na_2CO_3	% K_2CO_3	% Na_2CO_3
$K_2CO_3.2H_2O$							54.40					
							50.36	3.85				
$K_2CO_3.\frac{3}{2}H_2O$*			52.01		52.95				53.17*		52.82*	
					51.95	1.19						
$K_2CO_3.\frac{3}{2}H_2O + KNaCO_3.6H_2O$			49.80	2.89	49.77	4.37			48.44	5.06	49.0	4.60
$K_2CO_3.2H_2O + KNaCO_3.6H_2O$							49.04	5.13				
$KNaCO_3.6H_2O$	26.31	4.63	31.09	6.73	46.34	6.50			43.12	5.31	41.0	6.3
			23.13	11.52	44.92	6.34	47.59	5.32	32.10	10.45	31.0	10.5
					28.96	11.20	42.80	8.02	16.99	21.38	22.4	16.6
					21.37	16.91	27.60	15.48				
					17.52	20.50	19.47	20.04				
							14.85	22.77				
$KNaCO_3.6H_2O + Na_2CO_3.H_2O$							12.96†	25.30†				
$Na_2CO_3.H_2O$							9.61	27.21				
							6.47	28.85				
$K_2CO_3.3.75H_2O$	45.79											
$KNaCO_3.6H_2O + Na_2CO_3.7H_2O$									18.35	21.42	15.1	23.2
$KNaCO_3.6H_2O + K_2CO_3.3.75H_2O$	33.56	4.29										
$KNaCO_3.6H_2O + Na_2CO_3.10H_2O$	18.53	8.53										
$Na_2CO_3.7H_2O$									15.32	22.06		
$Na_2CO_3.7H_2O + Na_2CO_3.10H_2O$									12.26	23.05	14.5	22.8
$KNaCO_3.6H_2O + Na_2CO_3.10H_2O$					14.81†	23.47†						
$Na_2CO_3.10H_2O$					14.19	23.16			7.70	22.24	10.7	22.4
				10.69	9.99	23.55			1.17	22.45	4.7	21.9
						22.19				22.95		22.71

* Osaka (288) reports the solid to have the formula $K_2CO_3.2H_2O$ instead of $K_2CO_3.\frac{3}{2}H_2O$. He reports the solid phases in equilibrium with the solution to be $KNaCO_3.6H_2O$ and $Na_2CO_3.10H_2O$. He does not report $Na_2CO_3.7H_2O$ at this temperature.

† By graphical interpolation.

$C_2O_4^{--}$ K^+ (165): $H_2O + H_2C_2O_4 + K_2C_2O_4$

Solid phases	Liquid phase, t = 25°C	
	% C_2O_3	% K_2O
$C_2O_3.3H_2O$	8.290	0
$C_2O_3.3H_2O + \frac{1}{2}K_2O.2C_2O_3.\frac{7}{2}H_2O$	8.278	0.045
$\frac{1}{2}K_2O.2C_2O_3.\frac{7}{2}H_2O$	2.827	0.238
	1.790	0.555
	2.675	1.714
$\frac{1}{2}K_2O.2C_2O_3.\frac{7}{2}H_2O + \frac{1}{2}K_2O.C_2O_3.\frac{1}{2}H_2O$	3.450	2.360
$\frac{1}{2}K_2O.C_2O_3.\frac{1}{2}H_2O$	5.457	5.919
$\frac{1}{2}K_2O.C_2O_3.\frac{1}{2}H_2O + 2K_2O.3C_2O_3.3H_2O$	9.816	11.960
$2K_2O.3C_2O_3.3H_2O + K_2O.C_2O_3.H_2O$	12.365	15.71
$K_2O.C_2O_3.H_2O$	11.85	15.51

At *ca.* 64°C, $2KHC_2O_4.H_2O \leftrightarrow KHC_2O_4$.

$C_2H_3O_2^-$ $C_4H_4O_6^{--}$ Ca^{++} K^+

$H_2O + HC_2H_3O_2 + Ca(C_2H_3O_2)_2 + K_2C_4H_4O_6$
t = 25°C (172)

g $KC_2H_3O_2$/l*	g CaO/l*
$CaC_4H_4O_6$†	
0.0	0.5033
0.4905	0.4530
0.9810	0.4220
1.9620	0.3706
4.905	0.3273
9.810	0.3047
29.430	0.3600
49.050	0.4526

* Solution contained 18.23 g HCl per l at all determinations.
† Authors do not give actual composition of solid used.

$C_2H_3O_2^-$ $HC_4H_4O_6^-$ K^+

$H_2O + KC_2H_3O_2 + KHC_4H_4O_6$
t = 25°C (283)

$M_{KC_2H_3O_2}$/l*	$M_{KHC_4H_4O_6}$/l*
$KHC_4H_4O_6$	
0	0.0347
0.05	0.0410
0.10	0.0504
0.20	0.0634

* Determinations mean of two results.

$C_2H_3O_2^-$ Pb^{++}

$H_2O + Pb(OH)_2 + Pb(C_2H_3O_2)_2$
t = 25°C (218)

% $Pb(C_2H_3O_2)_2$	% PbO
$Pb(C_2H_3O_2)_2.3H_2O$	
35.19	−0.27*
37.14	+1.01
41.95	6.01
47.88	14.22
$Pb(C_2H_3O_2)_2.3H_2O + 3Pb(C_2H_3O_2)_2.PbO.3H_2O$	
48.95	15.89
$3Pb(C_2H_3O_2)_2.PbO.3H_2O$	
48.85	16.27
48.71	18.83
48.96	22.94
49.01	23.53

$C_2H_3O_2^-$ Pb^{++}.—(*Continued*)

% $Pb(C_2H_3O_2)_2$	% PbO
$3Pb(C_2H_3O_2)_2.PbO.3H_2O + Pb(C_2H_3O_2)_2.2PbO.4H_2O$	
49.21†	24.74†
$Pb(C_2H_3O_2)_2.2PbO.4H_2O$	
43.17	23.59
40.78	22.78
29.63	18.73
20.96	14.62
12.99	10.66
5.36	7.84
$Pb(OH)_2$	
4.71	7.17
4.25	6.54
3.40	5.29
0.11	0.20

t = ? (321)

M% $HC_2H_3O_2$	M% PbO
PbO	
0.20	1.0
0.48	1.07
0.54	1.05
$Pb(C_2H_3O_2)_2.2Pb(OH)_2$	
1.03	1.45
2.51	2.89
4.17	3.78
5.61	5.20
$Pb(C_2H_3O_2)_2.2Pb(OH)_2 + Pb(OH)C_2H_3O_2$	
7.26	7.15
$Pb(OH)C_2H_3O_2$	
7.79	6.51
7.72	5.59
$Pb(OH)C_2H_3O_2 + Pb(C_2H_3O_2)_2.3H_2O$	
7.92	5.18
$Pb(C_2H_3O_2)_2.3H_2O$	
7.30	4.38
5.36	3.34
13.07	3.16
16.78	3.80
21.53	4.18

* Acidity expressed in terms of PbO.
† Mean of two results.

$C_2H_3O_2^-$ Pb^{++} K^+

$H_2O + Pb(C_2H_3O_2)_2 + KC_2H_3O_2$; t = 25°C (140)

% $KC_2H_3O_2$	% $Pb(C_2H_3O_2)_2$
$Pb(C_2H_3O_2)_2.3H_2O$	
0	35.90
15.40	36.91
13.87	38.05

$C_2H_3O_2^-$ $Pb(N_3)_2$ Na^+; *v.* p. 356

$C_2H_3O_2^-$ BO_3^{---}

$H_2O + HC_2H_3O_2 + H_3BO_3$
t = 30°C (113)

% B_2O_3	% $(CH_3CO)_2O$
$B(OH)_3$	
3.55	0.0
$B(OH)_3$?	
0.45	84.55
$B_2O_3.2(CH_3CO)_2O$	
4.98	82.13
$B_2O_3.2(CH_3CO)_2O + B_2O_3.3(CH_3CO)_2O$	
5.00	87.80
$B_2O_3.3(CH_3CO)_2O$	
4.18	91.16
3.53	95.40

$C_2H_3O_2^-$ Mg^{++}

$H_2O + HC_2H_3O_2 + Mg(OH)_2$
t = 25°C (216)

% $HC_2H_3O_2$	% MgO
MgO	
3.36	1.73
8.06	4.21
12.46	6.54
$MgO + Mg(C_2H_3O_2)_2.4H_2O$	
15.46	8.24
$Mg(C_2H_3O_2)_2.4H_2O$	
14.25	7.24
20.19	7.47
22.93	7.60
26.61	7.74
31.37	7.99
$Mg(C_2H_3O_2)_2.4H_2O + 2Mg(C_2H_3O_2)_2.3HC_2H_3O_2.3H_2O$	
36.23	8.18
$2Mg(C_2H_3O_2)_2.3HC_2H_3O_2.3H_2O$	
40.87	7.42
47.86	6.74
56.16	5.81
61.59	4.68
65.19	4.36
69.13	3.75
75.93	2.85
82.90	2.23

$C_2H_3O_2^-$ Ba^{++}

$H_2O + HC_2H_3O_2 + Ba(C_2H_3O_2)_2$; t = 25°C (216)

% $HC_2H_3O_2$	% $Ba(C_2H_3O_2)_2$
$Ba(C_2H_3O_2)_2.3H_2O$	
0	5.18
0.41	5.21
$Ba(C_2H_3O_2)_2.3H_2O + 3Ba(C_2H_3O_2)_2.3HC_2H_3O_2.11H_2O$	
1.40	5.34
$3Ba(C_2H_3O_2)_2.3HC_2H_3O_2.11H_2O$	
2.42	4.03
5.61	3.04
16.92	3.24
26.48	4.41
33.14	5.23
42.08	7.85
$3Ba(C_2H_3O_2)_2.3HC_2H_3O_2.11H_2O + Ba(C_2H_3O_2)_2.2HC_2H_3O_2$	
46.51	8.87
$Ba(C_2H_3O_2)_2.2HC_2H_3O_2$	
46.49	9.10
51.98	8.62
58.35	8.72
65.77	8.40
77.06	7.79
85.27	7.36

Transition temperature, $Ba(C_2H_3O_2)_2.3H_2O + Ba(C_2H_3O_2)_2.H_2O$ at 24.7°C (392).

$C_2H_3O_2^-$ Na^+; *v.* p.375

$HC_4H_4O_6^-$ K^+

H_2O + *d*-$KHC_4H_4O_6$ + *l*-$KHC_4H_4O_6$; t = 20°C (48)

g *d*-$KHC_4H_4O_6$/l	g *l*-$KHC_4H_4O_6$/l
dl-$KHC_4H_4O_6$	
2.513	2.513
3.040	2.100
3.578	1.698
4.203	1.383
4.825	1.065
5.568	0.868
d-$KHC_4H_4O_6$	
5.040	0.940
5.260	0.470
5.440	0.0

$C_2H_3O_2^- \ Na^+$ (113, 114): $H_2O + HC_2H_3O_2 + NaOH$; *v.* Fig. 163*

Solid phases	Liquid phase—g per 100g H_2O							
	t = 0°C		t = 15°C		t = 30°C		t = 45°C	
	Na_2O	$(CH_3CO)_2O$	Na_2O	$(CH_3CO)_2O$	Na_2O	$(CH_3CO)_2O$	Na_2O	$(CH_3CO)_2O$
$NaC_2H_3O_2$			29.34	0.15	35.31	0.77	39.82	0.77
					26.25	8.92	32.69	2.04
							25.58	14.29
$NaC_2H_3O_2.3H_2O$	24.12	2.04	25.94	4.19	25.98	9.06	23.12	18.70
	19.82	3.83	22.24	4.88	18.09	13.62	22.46	18.85
	9.82	24.56	15.49	12.01	13.53	21.88	21.12	19.44
	9.75	40.0	11.45	23.54			16.04	26.39
$NaC_2H_3O_2.3H_2O + NaC_2H_3O_2.HC_2H_3O_2$	9.77	41.23	11.25	34.56	13.24	33.05	16.00	33.87
$NaC_2H_3O_2.HC_2H_3O_2$	9.04	43.94	10.24	39.73	7.64	65.07	10.84	51.00
			9.16	49.32			9.04	65.11
$NaC_2H_3O_2.HC_2H_3O_2 + NaC_2H_3O_2.2HC_2H_3O_2$	8.96	44.80	8.56	54.34	7.67	66.42		
$NaC_2H_3O_2.2HC_2H_3O_2$	7.83	50.03	6.17	68.81	6.94	71.39	5.54	82.16
	6.26	60.64	5.52	73.02	5.52	77.76	4.25	85.38
	4.02	79.29	2.87	86.61	2.94	86.73	2.36	94.23
	0.57	96.16	0.79	98.09	1.27	94.78		

* The lines separating the fields of this diagram and the transition points indicated are all approximations.

$HC_4H_4O_6^- \ C_{21}H_{23}N_2O_2^+$ (115)
H_2O + Strychnine *l*-tartrate + Strychnine *d*-tartrate

Solid phases	Liquid phase							
	t = 7.35°C		t = 16°C		t = 25°C		t = 40°C	
	% *l*-tartrate	% *d*-tartrate	% *l*-tartrate	% *d*-tartrate	% *l*-tartrate	% *d*-tartrate	% *l*-tartrate	% *d*-tartrate
l-Tartrate	0.939		1.136		1.428		2.238	
	0.834	0.259	0.962	0.351	1.240	0.453	1.925	0.689
	0.733	0.519	0.837	0.702	1.087	0.906	1.795	1.151
	0.670	0.778m	0.727	1.055	0.937	1.361	1.737	1.382
							1.651	1.730
							1.596	2.802
d-Tartrate	0.593	0.904m	0.911	0.970	0.856	1.561m	1.678	2.129
	0.394	1.050m	0.682	1.132	0.570	1.788m	1.116	2.460
	0.197	1.224	0.226	1.503	0.285	2.164	0.892	2.633
		1.393		1.741		2.236	0.444	2.984
								3.397
Racemate	1.381 (% r)		1.876 (% r)		2.408 (% r)		3.706 (% r)	
d-Tartrate + *l*-Tartrate	1.487 (% *d* + *l*)		1.928 (% *d* + *l*)		2.442 (% *d* + *l*)		3.832 (% *d* + *l*)	
d-Tartrate + Racemate	1.477 (% *d* + r)		1.767 (% *d* + r)		2.348 (% *d* + r)			
l-Tartrate + Racemate	1.380 (% *l* + r)		1.821 (% *l* + r)		2.340 (% *l* + r)			
	t = 8.9°C		t = 30°C		t = 32°C			
d-Tartrate + *l*-Tartrate			2.741 (% *d* + *l*)		2.962 (% *d* + *l*)			
Racemate	1.481 (% r)							
l-Tartrate + Racemate	1.422 (% *l* + r)		2.736 (% *l* + r)		2.467 (% *l* + r)			

dl-$C_4H_4O_6^{--} \ Na^+ \ K^+$ (196): H_2O + *dl*-$Na_2C_4H_4O_6$ + *dl*-$K_2C_4H_4O_6$

°C	Solid phases	Liquid phase—M per 1000M H_2O			Transition points	
		A*	B*	C*	°C	Solid phases
9.7	$(NaKC_4H_4O_6.3H_2O)_2$	49.6			−6	$(NaKC_4H_4O_6.4H_2O)_2$ Tartrate + $(NaKC_4H_4O_6.3H_2O)_2$ Racemate
29.5		79.0				
41	$(NaKC_4H_4O_6.3H_2O)_2 + (Na_2C_4H_4O_6)_2 + (K_2C_4H_4O_6.2H_2O)_2$		21.7	56.9	33	$(NaKC_4H_4O_6.4H_2O)_2$ Tartrate + $(Na_2C_4H_4O_6)_2$ + $(K_2C_4H_4O_6.2H_2O)_2$

*A = $NaKC_4H_4O_6$; B = $Na_2C_4H_4O_6$; C = $K_2C_4H_4O_6$.

$C_4H_4O_6^{--}$ Na^+ K^+ (245)
$H_2O + Na_2C_4H_4O_6 + K_2C_4H_4O_6$

°C	Solid phases	Liquid phase* % $K_2C_4H_4O_6$	Liquid phase* % $Na_2C_4H_4O_6$
18	$NaKC_4H_4O_6.4H_2O$	19.20	16.50
20.9	$Na_2C_4H_4O_6.2H_2O + NaKC_4H_4O_6.4H_2O$	11.80	27.85
26.6	$K_2C_4H_4O_6.\frac{1}{2}H_2O + NaKC_4H_4O_6.4H_2O$	56.05	4.25
38	$Na_2C_4H_4O_6.2H_2O + NaKC_4H_4O_6.4H_2O$	25.80	24.70
38	$KNaC_4H_4O_6.4H_2O$	26.60	22.80
48.3	$K_2C_4H_4O_6.\frac{1}{2}H_2O + NaKC_4H_4O_6.4H_2O$	51.65	13.20
50	$Na_2C_4H_4O_6.2H_2O + NaKC_4H_4O_6.4H_2O$	36.70	23.85
59.7	$Na_2C_4H_4O_6.2H_2O + K_2C_4H_4O_6.\frac{1}{2}H_2O$	44.50	25.30
80	$Na_2C_4H_4O_6.2H_2O + K_2C_4H_4O_6.\frac{1}{2}H_2O$	39.70	34.70

* Most of these figures represent the mean of two determinations.

$C_7H_5O_3^-$ (salicylate ion) Na^+
$H_2O + C_7H_6O_3 + NaC_7H_5O_3$
$t = 20.1°C$ (211)

$M_{C_7H_6O_3}/l$	$M_{C_7H_5O_3Na}/l$
$C_7H_6O_3$	
0.0132	0.000
0.0117	0.006
0.0124	0.113
0.0135	0.175
0.0148	0.257
0.0164	0.344
0.0186	0.422
0.0242	0.682
0.0312	0.94
0.062	1.70
$C_7H_6O_3 + C_7H_6O_3.C_7H_5O_3Na$	
0.095	2.11
$C_7H_6O_3.C_7H_5O_3Na$	
0.091	2.19
0.087	2.40
0.086	3.41
0.085	3.80
$C_7H_6O_3.C_7H_5O_3Na + C_7H_5O_3Na.6H_2O$	
0.082	4.215
$C_7H_5O_3Na.6H_2O$	
0.048	4.18
0.021	4.12
0.000	4.165

CN^- Tl^+ K^+
$H_2O + TlCN + KCN$
$t = 25°C$ (25)

% KCN	% TlCN
KCN	
41.70	0.0
40.83	0.71
39.76	1.65
$KCN + KTl(CN)_2$	
37.02*	3.17*
$KTl(CN)_2$	
37.50	3.11
36.52	4.12
35.93	5.78
TlCN	
36.00	4.99
35.27	4.98
34.36	4.90
31.25	4.46
30.21	5.00
28.07	4.47
21.00	4.36
14.75	5.46
9.12	7.17
0.51	16.20
0.34	16.12
0.0	15.61*

* Mean of two determinations.

$HC_4H_4O_6^-$ $C_{23}H_{27}N_2O_4^+$ (115)
H_2O + Brucine *d*-tartrate + Brucine *l*-tartrate

Solid phases	Liquid phase $t = 20°C$ % *l*-tartrate	% *d*-tartrate	$t = 25°C$ % *l*-tartrate	% *d*-tartrate	$t = 35°C$ % *l*-tartrate	% *d*-tartrate	$t = 44°C$ % *l*-tartrate	% *d*-tartrate	$t = 50°C$ % *l*-tartrate	% *d*-tartrate
d-Tartrate				0.996		1.255		1.563		1.822
l-Tartrate			1.81		3.14		4.44		6.15	
l-Tartrate + *d*-Tartrate	1.374(% *d* + *l*)		1.723(% *d* + *l*)		2.95(% *d* + *l*)		5.3(% *d* + *l*)		7.04(% *d* + *l*)	

CN^- Cu^+ K^+
$H_2O + CuCN + KCN$; *v.* Fig. 164
$t = 25°C$ (25)

	Solid phases	Liquid phase % CuCN	% KCN
	CuCN	Tr.	Tr.
A	$CuCN + KCu_2(CN)_3.H_2O$	Tr.	0.42*
	$KCu_2(CN)_3.H_2O$	0.60	1.34
		1.68	3.27
		1.87	4.21
		3.88	6.03
B		7.52	9.97
	$KCu(CN)_2$	8.84	12.10
		13.78	19.95
		14.71	22.32
C		22.59	34.77
	$K_3Cu(CN)_4.H_2O$	22.52	35.28
D		18.47	34.82
E		12.92	36.24
F		6.13	41.94
	$K_3Cu(CN)_4$	15.30	33.86
		10.86	35.96
		5.84	41.70
	KCN	4.20	40.31
		2.16	40.53
G			41.70

* Mean of six determinations.

CN^- Ag^+ K^+
$H_2O + AgCN + KCN$; *v.* Fig. 165
$t = 25°C$ (25)

	Solid phases	Liquid phase % KCN	% AgCN
A	KCN	41.70	
		40.77	6.52
		39.91	8.14
B		40.24	10.93
	$K_3Ag(CN)_4.H_2O$	40.44	13.71
		37.76	18.92
C		35.19	25.18
	$KAg(CN)_2$	28.43	26.37
D		26.67	24.71
		20.14	21.66
E		8.56	16.11
F	$KAg_2(CN)_3.H_2O$	8.05	15.76
		8.93	17.73
		6.75	13.53
	AgCN	2.36	4.42
		1.64	3.27
G		1.26	2.31
		0.17	Tr.

CN^- Au^+ K^+

$H_2O + AuCN + KCN$

$t = 25°C$ (25)

% AuCN	% KCN
AuCN	
6.12	2.37
7.32	2.32
7.27	2.60
$AuCN + KAu(CN)_2$	
15.47	4.78
$KAu(CN)_2$	
11.02	5.19
8.34	7.02
2.97	9.66
2.55	13.70
0.27	23.79
0.76	24.04
0.35	38.98
$KAu(CN)_2 + KCN$	
0.17	41.98
KCN	
	41.70
Tr.	42.02

CNS^- Ag^+ K^+

$H_2O + AgCNS + KCNS$

$t = 25°C$ (131)

% KCNS	% AgCNS
KCNS	
70.53	0.0
KCNS + 2KCNS.AgCNS	
66.55	9.32
2KCNS.AgCNS	
64.47	10.62
61.25	11.76
58.34	13.55
53.21	17.53

CNS^- Ag^+ K^+.—(*Continued*)

% KCNS	% AgCNS
2KCNS.AgCNS + KCNS.-AgCNS	
50.68	20.43
KCNS.AgCNS	
49.43	20.32
32.51	18.34
24.68	16.41
KCNS.AgCNS + AgCNS	
23.86	16.08

$C_9H_8NO_3^-$ K^+

$H_2O + C_9H_9NO_3$ (hippuric acid) $+ C_9H_8KNO_3$

$t = 20.1°C$ (211)

$M_{C_9H_9NO_3}/l$	$M_{C_9H_8NO_3K}/l$
$C_9H_9NO_3$	
0.0182	0.0
0.0163	0.011
0.0183	0.071
0.0218	0.198
0.0272	0.394
0.061	1.39
0.068	1.44
0.122	2.13
$C_9H_9NO_3 + C_9H_9NO_3$.-$C_9H_8NO_3K.?H_2O$	
0.150*	2.45*
$C_9H_9NO_3.C_9H_8NO_3K.?H_2O$	
0.133	2.50
0.091	2.96
$C_9H_9NO_3.C_9H_8NO_3K$.-$?H_2O + C_9H_8NO_3K$	
0.0665*	3.575*
$C_9H_8NO_3K$	
0.031	3.56
0.011	3.55
0.0	3.555*

* Mean of two results.

$C_{20}H_{12}O_4^{--}$ $C_{20}H_{13}O_4^-$ Na^+ (26)

H_2O + Phenolphthalein + NaOH; *v.* Fig. 166

	Solid phases	Liquid phase, 25°C: % Na_2O	Liquid phase, 25°C: % $C_{20}H_{12}O_3$
B	$C_{20}H_{12}O_3 + C_{20}H_{13}O_4Na.4H_2O$	6.40	33.50
C	$C_{20}H_{13}O_4Na.4H_2O + C_{20}H_{12}O_4Na_2.8H_2O$	10.06	44.06
D	$C_{20}H_{13}O_4Na.8H_2O$	6.95	36.06
E	$C_{20}H_{13}O_4Na.8H_2O$	8.32	41.16
F	$C_{20}H_{12}O_4Na_2.8H_2O + C_{20}H_{11}O_4Na_3.14H_2O$	10.00	33.50
G	$C_{20}H_{12}O_4Na_2.4H_2O$	11.67	37.79
H	$C_{20}H_{12}O_4Na_2.4H_2O$	11.98	34.68
I	$C_{20}H_{12}O_4Na_2$	11.00	45.55
J	$C_{20}H_{12}O_4Na_2$	12.31	40.16
K	$C_{20}H_{11}O_4Na_3.14H_2O + C_{20}H_{11}O_4Na_3.13H_2O$	13.60	22.50
L	$C_{20}H_{11}O_4Na_3.13H_2O + C_{20}H_{11}O_4Na_3.12H_2O$	19.50	9.50
M	$C_{20}H_{11}O_4Na_3.12H_2O + C_{20}H_{11}O_4Na_3.6H_2O$	26.60	0.75

Zn^{++} CrO_4^{--}: $H_2O + ZnO + H_2CrO_4$

$t = 25°C$ (153)

g CrO_3/l	g ZnO/l	g CrO_3/l	g ZnO/l
$4ZnO.CrO_3.3H_2O$ + ?		$4ZnO.2CrO_3.3H_2O$	
0.010*	0.013*	151.0	66.10
$4ZnO.CrO_3.3H_2O$		$4ZnO.2CrO_3.3H_2O + 3ZnO$.-$2CrO_3.H_2O$	
0.604	0.409	192.0*	83.70*
4.190	2.240	$3ZnO.2CrO_3.H_2O$	
$4ZnO.CrO_3.3H_2O + 3ZnO$.-$CrO_3.2H_2O$		285.0	123.0
11.45*	5.865*	450.0	193.0
$3ZnO.CrO_3.2H_2O$		$3ZnO.2CrO_3.H_2O + ZnO$.-$CrO_3.H_2O$	
22.20	10.70	462.0*	196.5*
57.50	26.70	$ZnO.CrO_3.H_2O$	
$3ZnO.CrO_3.2H_2O + 4ZnO$.-$2CrO_3.3H_2O$		475.0	202.0
66.60*	30.35*	769.0	318.0
$4ZnO.2CrO_3.3H_2O$		970.0	389.0
70.60	32.20		

* Mean of two or more results.

ZnO^- Na^+

$H_2O + ZnO + NaOH$

$t = 30°C$ (151); *v.* Fig. 167

	Solid phases	Liquid phase: % Na_2O	Liquid phase: % ZnO
A	$Na_2O.3H_2O$	41.9	0
		40.7	2.0
B	$Na_2O.ZnO.4H_2O + Na_2O.3H_2O$	39.2	9.70
C	$Na_2O.ZnO.4H_2O$	33.2	11.2
D	$ZnO + Na_2O.ZnO.4H_2O$	27.8	16.5
	ZnO	24.6	12.6
E		11.8	2.6
	$Zn(OH)_2$	19.9m	15.2m
		13.7	7.2
		10.1	4.7
		4.6	1.0

ZnO^- K^+

$H_2O + ZnO + KOH$

t = room (230)

M_{KOH}/l	M_{Zn}/l
$K_2Zn_2O_3$	
2.78	0.540
2.38	0.405
2.28	0.368
2.02	0.330
1.81	0.272
1.63	0.266
1.56	0.223
1.42	0.209
0.90	0.100

Pb^{++} CrO_4^{--}

$H_2O + Pb(OH)_2 + H_2CrO_4$

$t = 25°C$ (90)

M_{CrO_3}/l	
$CrO_3 + PbCr_2O_7$	
10.79	
$PbCr_2O_7$	
8.196	
$PbCr_2O_7 + PbCrO_4$	
6.865	

Pb^{++} CrO_4^{--}.—(*Continued*)

M_{CrO_3}/l	
$PbCrO_4$	
6.04	
4.90	
2.95	
1.22	
0.49	
0.08	
0.013	
0.0005	
$PbCrO_4 + 2PbO.CrO_3$	
0.00002	

PbO^- Na^+

$Pb(OH)_2 + NaOH$

$t = 20°C$(8)

M_{PbO}/l*	M_{NaOH}/l
PbO (yellow)	
0.0237	1.00
PbO (red)	
0.0140	1.00

* Glasstone (147) determined solubility of a hydrate of PbO in solutions of NaOH of varying concentrations; for 0.9985N at 25°C, he obtained 0.062M PbO per liter.

Th^{++++} CrO_4^{--} (44)
$H_2O + H_2CrO_4 + Th(CrO_4)_2$; *v.* Fig. 168

	Solid phases	Liquid phase, 25°C	
		% CrO_3	% ThO_2
A	CrO_3	62.87	
B	$ThO_2.3CrO_3.3H_2O$	52.60	7.91
C	$ThO_2.3CrO_3.3H_2O + ThO_2.2CrO_3.3H_2O$	39.49	24.22
	$ThO_2.2CrO_3.3H_2O$	0.033	0.044

Hg^{++} CrO_4^{--} (89, 90): $H_2O + HgO + H_2CrO_4$

t = 25°C		t = 50°C	
M_{CrO_3}/l	M_{HgO}/l	M_{CrO_3}/l	M_{HgO}/l
$CrO_3 + HgCr_2O_7$			
11.40*			
$HgCr_2O_7 + HgCrO_4$			
10.40	0.7585		
$HgCrO_4$			
9.90		1.006	0.1
6.73		0.907	0.092
4.16		0.740	0.072
2.08		0.683	0.071m
1.035		0.583	0.061m
		0.522	0.050m
		0.499	0.049m

t = 25°C		t = 50°C	
M_{CrO_3}/l	M_{HgO}/l	M_{CrO_3}/l	M_{HgO}/l
$HgCrO_4 + 3HgO.CrO_3$			
		0.712*	0.0745*
$3HgO.CrO_3$			
		0.64	0.0605
		0.475	0.035
		0.371	0.0225
		0.254	0.012
		0.154	0.0036
		0.00137	
$3HgO.CrO_3$			
		0.00012	

* Mean of several determinations.

$Pt(CN)_4^{--}$ Li^+ K^+ (379)
$H_2O + Li_2Pt(CN)_4 + K_2Pt(CN)_4$; *v.* Fig. 169

	Solid phases	Liquid phase, 24.1°C	
		% $K_2Pt(CN)_4$	% $Li_2Pt(CN)_4$
A	$K_2Pt(CN)_4.3H_2O$	28.60	
B	$K_2Pt(CN)_4.3H_2O$	23.60	10.20
C	$K_2Pt(CN)_4.3H_2O$	16.10	27.30
D	$K_2Pt(CN)_4.3H_2O$	18.65	29.30
E	$LiKPt(CN)_4.2H_2O$	13.90	30.50
	$Li_2Pt(CN)_4.5H_2O$		59.20

MnO_4^- K^+ (319)
$H_2O + KOH + KMnO_4$; *v. also* p. 379

°C	M KOH/l	M $KMnO_4$/l	M KOH/l	M $KMnO_4$/l	M KOH/l	M $KMnO_4$/l	M KOH/l	M $KMnO_4$/l
	$KMnO_4$							
0	0	0.176	1	0.050	2	0.031	4	0.027
10	0	0.278	1	0.112	2	0.068	4	0.048
20	0	0.411	1	0.179	2	0.119	4	0.079
30	0	0.573						
32			1	0.316	2	0.213	4	0.149
40	0	0.792	1	0.439	2	0.306	4	0.211
50			1	0.638	2	0.462	4	0.304
53	0	1.154						
60					2	0.639		
61			1	0.904				
63	0	1.429						
70	0	1.812	1	1.172	2	0.869	4	0.572
75	0	2.047					4	0.651
80			1	1.513	2	1.190		
83							4	0.803
84			1	1.655	2	1.352		

MnO_4^- K^+ Rb^+
$H_2O + KMnO_4 + RbMnO_4$
t = 6.8–7.2°C (277)

Solid phases	Wt. % $RbMnO_4$	Liquid phase	
		% $KMnO_4$	% $RbMnO_4$
$KMnO_4$			0.60
Solid soln. I	2.728	0.425	0.461
Solid soln. I	4.625	0.787	0.397
Solid solns. I + II	10.979	1.237	0.368
Solid solns. I + II	20.790	1.502	0.460
Solid solns. I + II	28.767	1.870	0.629
Solid solns. I + II	64.574	2.568	0.818
Solid solns. I + II	90.514	3.057	0.822
Solid soln. II	99.264	3.154	0.902
Solid soln. II	99.178	3.195	0.825
Solid soln. II	99.152	3.468	0.517
$RbMnO_4$	100.00	4.071	0

$Fe(CN)_6^{----}$ Ca^{++} Na^+ (405)
$H_2O + Ca_2Fe(CN)_6 + Na_4Fe(CN)_6$

$Fe(CN)_6^{----}$ Na^+ K^+
$H_2O + Na_4Fe(CN)_6 + K_4Fe(CN)_6$
t = 25°C (164)
g per 1000g H_2O

$K_4Fe(CN)_6$	$Na_4Fe(CN)_6$
$K_4Fe(CN)_6.3H_2O$	
0.8946	0.0
0.88272	0.05072
0.88544	0.06633
0.88088	0.12306
0.89116	0.25972
0.91600	0.4900
0.99000	0.87034
1.01200	0.91060
1.05177	0.95879
1.11590	1.04380
$Na_4Fe(CN)_6.12H_2O$	
1.0578	0.9588
0.6994	0.8984
0.6111	0.8712
0.5850	0.8652
0.3532	0.7814
0.2722	0.7610
0.2115	0.7253
0.1789	0.7213
0.1624	0.7117
0.1327	0.7056
0.000	0.6818

CrO_3^{---} Na^+
$H_2O + H_3CrO_3 + NaOH$
t = 18°C (275)

M_{NaOH}/l	M_{Cr}/l
$Cr(OH)_3$*	
4.9	0.016
8.1	0.052
9.5	0.076
11.8	0.080
14.6	0.143
17.6	0.015

CrO_3^{---} Na^+.—(*Continued*)

M_{NaOH}/l	M_{Cr}/l
Cr_2O_3	
7.5	Tr.
9.0	0.0038
11.2	0.0081
14.5	0.0205
15.8	0.0039
16.8	0.0015
18.0	Tr.
Na_3CrO_3(?)	
16.5	0.004
15.5	0.006
14.5	0.010
14.0	0.0134
13.2	0.0165
11.2	0.038
15.5	0.057

* Author states that the polymerization changes in the solid phase play an important part in the equilibrium here concerned.

CrO_4^{--} BO_3^{---} (145)
$H_2O + H_2CrO_4 + H_3BO_3$
t = 25°C

% B_2O_3	% CrO_3
H_3BO_3	
0.10	62.40
0.16	59.90
0.42	49.75
0.92	37.89
1.35	24.31
2.28	9.42
2.79	4.90
t = 45°C	
H_3BO_3	
0.9	61.56
0.92	58.10
0.87	57.50
1.12	57.34
0.85	53.80
2.33	25.60
4.76	24.0

MnO_4^{--} K^+ (319)

$H_2O + KOH + K_2MnO_4$

°C	M KOH/l	M K_2MnO_4/l	M KOH/l	M K_2MnO_4/l	M KOH/l	M K_2MnO_4/l	M KOH/l	M K_2MnO_4/l	M KOH/l	M K_2MnO_4/l
					K_2MnO_4					
0	2	0.907	4	0.554	6	0.155	8	0.063	10	0.0145
10	2	1.013					8	0.070	10	0.0152
15					6	0.224				
17			4	0.681						
20	2	1.140					8	0.078	10	0.016
23					6	0.261				
25			4	0.733						
30	2	1.252	4	0.772	6	0.303	8	0.096	10	0.0215
40			4	0.852	6	0.362	8	0.119	10	0.0305
45	2	1.424	4	0.889	6	0.388				
50							8	0.142	10	0.0462
51			4	0.938						
60			4	1.003	6	0.469	8	0.167		
63									10	0.062
70			4	1.074	6	0.528	8	0.196	10	0.070
80			4	1.143	6	0.587	8	0.222	10	0.083

CrO_4^{--} MoO_4^{--} K^+

$H_2O + K_2CrO_4 + K_2MoO_4$

$t = 25°C$ (2)

Solid phases	% K_2MoO_4	Liquid phase—g per 100g H_2O: K_2CrO_4	K_2MoO_4
K_2CrO_4		64.62	0.0
Solid soln	0.35	49.59	15.37
	0.57	38.90	38.79
	0.94	33.21	50.96
	1.25	14.13	98.72
	2.58	10.07	118.80
	2.98	10.24	119.90
	5.32	7.12	137.8
	6.74	6.32	157.2
	10.34	4.92	165.4
	26.80	2.14	180.8
	36.21	1.70	183.0
K_2MoO_4		0.0	184.6

CrO_4^{--} Li^+ (336)

$H_2O + H_2CrO_4 + LiOH$; *v.* Fig. 170

	Solid phases	Liquid phase, 30°C: % CrO_3	% Li_2O
A	$Li(OH).H_2O$		7.09
B	$Li(OH).H_2O + Li_2O.CrO_3.2H_2O$	37.50	14.34
C	$Li_2O.CrO_3.2H_2O$	38.55	11.44
D	$Li_2O.CrO_3.2H_2O + Li_2O.2CrO_3.2H_2O$	43.40	11.81
E	$Li_2O.2CrO_3.2H_2O$	47.95	7.95
F	$Li_2O.2CrO_3.2H_2O + CrO_3$	67.73	5.69
	CrO_3	63.99	3.51
H		62.28	0

CrO_4^{--} Na^+ (336)

$H_2O + H_2CrO_4 + NaOH$; *v.* Fig. 171

	Solid phases	Liquid phase, 30°C: % CrO_3	% Na_2O
A	N OH.H_2O		42.0 *ca.*
B	$NaOH.H_2O + Na_2O.CrO_3$	2.0	41.44

CrO_4^{--} Na^+.—(*Continued*)

	Solid phases	Liquid phase, 30°C: % CrO_3	% Na_2O
C	$Na_2O.CrO_3 + 2Na_2O.CrO_3.13H_2O$	10.22	29.39
	$2Na_2O.CrO_3.13H_2O$	13.12	23.91
E	$2Na_2O.CrO_3.13H_2O + Na_2O.CrO_3.4H_2O$	19.26	22.98
F	$Na_2O.CrO_3.4H_2O$	28.82	17.88
G	$Na_2O.CrO_3.4H_2O + Na_2O.2CrO_3.2H_2O$	48.70	16.49
H	$Na_2O.2CrO_3.2H_2O + Na_2O.3CrO_3.H_2O$	66.13	13.70
I	$Na_2O.3CrO_3.H_2O + Na_2O.4CrO_3.4H_2O$	68.46	10.95
J	$Na_2O.4CrO_3.4H_2O + CrO_3$		
K	CrO_3	62.28	

CrO_4^{--} K^+; *v.* p. 380

BO_3^{---} Ca^{++}: $H_2O + H_3BO_3 + Ca(OH)_2$

$t = 30°C$ (324)

% CaO	% B_2O_3
$CaO.H_2O$	
0.1263	0.0140
0.1398	0.0321
aO.H_2O + $CaO.B_2O_3.6H_2O$	
0.2113*	0.1291*
$CaO.B_2O_3.6H_2O$	
0.22	0.1335
0.1177	0.1379
0.1085	0.1395
0.110	0.140
$CaO.B_2O_3.6H_2O$ + CaO.-$3B_2O_3.9H_2O$	
0.1100*	0.1688*
$CaO.3B_2O_3.9H_2O$	
0.0516	0.2897
0.0555	0.3306
0.0471	0.6117
0.0595	0.7669
0.0666	0.8691
0.0772	1.025
0.0759	1.116

% CaO	% B_2O_3
$CaO.3B_2O_3.9H_2O$ + CaO.-$3B_2O_3.12H_2O$	
0.0936*	1.359*
$CaO.3B_2O_3.12H_2O$	
0.1436	1.64
0.0928	2.0588
0.2153	2.178
0.2743	2.471
0.2232	2.434
0.0991	2.509
0.1095	2 55
0.2633	2.6055
0.1085	2.798
0.1304	3.128
0.1433	3.3133
0.3719	3.643
0.152	3.841
$CaO.3B_2O_3.12H_2O + H_3BO_3$	
0.155	4.250
H_3BO_3	
0.1368	4.1793

* Average of several determinations

CrO_4^{--} K^+ (234): $H_2O + H_2CrO_4 + KOH$; v. Fig. 172

	Solid phases	Liquid phase, t = 0°C, % K_2O	t = 0°C, % CrO_3	t = 20°C, % K_2O	t = 20°C, % CrO_3	t = 30°C*, % K_2O	t = 30°C*, % CrO_3	t = 60°C, % K_2O	t = 60°C, % CrO_3
A	$KOH.2H_2O$	31.18				46.80		50 *ca.*	
B	$K_2O.CrO_3$	26.06	0.54			26.89	0.94	32.98	0.53
		17.73	5.50			19.52	6.99	21.05	9.15
D	$K_2O.CrO_3 + K_2O.2CrO_3$	17.73	19.10			19.35	21.00	20.62	23.61
E	$K_2O.2CrO_3$	1.41	3.00			4.98	10.48	10.01	21.24
F	$K_2O.2CrO_3 + K_2O.3CrO_3$	1.47	42.00	2.20	43.10	2.50	44.50	7.06	49.84
G	$K_2O.3CrO_3 + K_2O.4CrO_3$	1.37	47.40	2.00	48.46	2.25	49.95	5.01	54.09
H	$K_2O.4CrO_3 + CrO_3$	0.64	61.80	0.62	62.80	0.69	62.81	1.27	65.77
I	CrO_3		61.54		61.80		62.52		65.12

* In good agreement with work of Schreinemakers (336).

CrO_4^{--} K^+.—(*Continued*)

°C	% K_2O	% CrO_3
$H_2O + K_2CrO_4$		
−25	20.0	5.70
−13	17.52	13.89
$H_2O + K_2CrO_4 + K_2Cr_2O_7$		
−11.50	17.18	18.11
$H_2O + K_2Cr_2O_7$		
− 5	8.27	8.01
− 0.63	1.38	2.93
− 6.43	0.48	17.25
−10.25	0.45	23.63
−13.25		27.07
$H_2O + K_2Cr_2O_7$		
−22.10		35.94
−26.77	0.88	39.86
$H_2O + K_2Cr_2O_7 + K_2Cr_3O_{10}$		
−30.19	1.18	42.42
$H_2O + K_2Cr_3O_{10}$		
−34.01	0.95	43.45
$H_2O + K_2Cr_3O_{10} + K_2Cr_4O_{13}$		
−39	0.79	45.69
$H_2O + K_2Cr_4O_{13}$		
−49		49.11
−61.5	0.61	53.57

BO_3^{---} Li^+ (112)
$H_2O + H_3BO_3 + LiOH$; v. Fig. 173

	Solid phases	Liquid phase, 30°C, % Li_2O	% B_2O_3
A	$B(OH)_3$		3.54
B	$B(OH)_3 + Li_2O.5B_2O_3.10H_2O$	1.30	14.14
C	$Li_2O.5B_2O_3.10H_2O + Li_2O.2B_2O_3.xH_2O$*	5.06	30.81
D	$Li_2O.2B_2O_3$	0.53	2.47
E		0.95	2.61
F	$Li_2O.2B_2O_3.xH_2O + Li_2O.B_2O_3.16H_2O$*	5.63	23.84
G	$Li_2O.B_2O_3.16H_2O$	1.58	3.27
H		2.94	2.51
I	$Li_2O.B_2O_3.16H_2O + LiOH.H_2O$	7.71	3.38
J	$LiOH.H_2O$	7.01	

* Evidence for saturation with this solid from graphical interpolation.

BO_3^{---} Na^+ (111)
$H_2O + H_3BO_3 + NaOH$; v. Fig. 174

	Solid phases	Liquid phase, 30°C, % Na_2O	% B_2O_3
A	$B(OH)_3$		3.54
B	$B(OH)_3 + Na_2O.5B_2O_3.10H_2O$	1.99	11.84
C	$Na_2O.5B_2O_3.10H_2O + Na_2O.2B_2O_3.10H_2O$	4.08	17.20
D	$Na_2O.2B_2O_3.10H_2O$	1.88	2.41
E*	$Na_2O.2B_2O_3.10H_2O + Na_2O.B_2O_3.8H_2O$	10.40	12.80
F	$Na_2O.B_2O_3.8H_2O$	13.25	8.18
G		18.31	4.97
H	$Na_2O.B_2O_3.8H_2O + Na_2O.B_2O_3.4H_4O$	21.58	4.63
I	$Na_2O.B_2O_3.4H_2O$	29.39	2.51
J*	$Na_2O.B_2O_3.4H_2O + NaOH.H_2O$	41.30	7.80

* By interpolation.

BO_3^{---} K^+ (111)
$H_2O + H_3BO_3 + KOH$; v. Fig. 175

	Solid phases	Liquid phase, 30°C, % K_2O	% B_2O_3
A	$B(OH)_3$		3.54
B	$B(OH)_3 + K_2O.5B_2O_3.8H_2O$	0.33	4.58
C	$K_2O.5B_2O_3.8H_2O$	0.80	3.05
D	$K_2O.5B_2O_3.8H_2O + K_2O.2B_2O_3.4H_2O$	7.73	13.37
E	$K_2O.2B_2O_3.4H_2O$	6.22	9.13
F		9.18	8.0
G*	$K_2O.2B_2O_3.4H_2O + K_2O.B_2O_3.\frac{5}{2}H_2O$	25.0	19.8
H	$K_2O.B_2O_3.\frac{5}{2}H_2O$	26.89	12.12
I		32.74	3.51
J	$K_2O.B_2O_3.\frac{5}{2}H_2O + KOH.2H_2O$	46.45	0.72
K	$KOH.2H_2O$	47.50	

* By interpolation.

AlO_2^- Ba^{++}
$H_2O + Al_2O_3 + BaO$
t = 20°C (253)

% BaO	% Al_2O_3
$Ba(OH)_2.8H_2O$	
3.32	0.0
3.39	0.002
3.45	0.430
$Ba(OH)_2.8H_2O + Al_2O_3$	
3.50	0.680
$2BaO.Al_2O_3.5H_2O$	
3.51	0.673
3.541	0.659
3.523	0.661
2.211	0.641
$2BaO.Al_2O_3.5H_2O + Al_2O_3$	
2.131	0.628
$BaO.6H_2O$	
2.091	0.618
2.154	0.637
2.117	0.625
$Al_2O_3.BaO.6H_2O$	
1.873	0.456
1.732	0.378
1.654	0.345
1.330	0.279
$Al_2O_3.BaO.6H_2O + Al_2O_3.xH_2O$	
1.205*	0.210*
$Al_2O_3.xH_2O$	
0.902	0.118

AlO_2^- Ba^{++}.—(*Continued*)

% BaO	% Al_2O_3
$Al_2O_3.xH_2O$	
0.519	0.037
0.01	0.002

* Mean of several results.

AlO_2^- Na^+; v. p. 381

Be^{++} (= Gl^{++})Na^+
$H_2O + Be(OH)_2 + NaOH$
t = 25°C (401)

M_{Be}/l	M_{Na}/l
$Be(OH)_2$	
0.033	0.268
0.0492	0.318
0.0841	0.446
0.089	0.526
0.101	0.563
0.143	0.801
0.203	0.854

Ba^{++} Na^+
$H_2O + BaO + Na_2O$
t = 30°C (339)

% BaO	% Na_2O
$BaO.9H_2O$	
4.99	0
1.29	4.78
0.89	6.43
0.57	9.63
0.53	11.62
0.47	17.87
1.06	23.28

Ba^{++} Na^{+}.—(*Continued*)

% BaO	% Na_2O
$BaO.9H_2O + BaO.4H_2O$	
1.87	24.63
$BaO.4H_2O$	
1.84	26.14
1.75	27.72
1.58	28.43
$BaO.4H_2O + BaO.2H_2O$	
1.34	29.24

Ba^{++} Na^{+}.—(*Continued*)

% BaO	% Na_2O
$BaO.2H_2O$	
0.82	32.12
0.59	34.72
$BaO.2H_2O + NaOH.H_2O$	
0.57	41.09
$NaOH.H_2O$	
0	42.00

AlO_2^- Na^+ (152)

$H_2O + H_3AlO_3 + NaOH$; *v.* Fig. 176

	Solid phases	Liquid phase, 30°C % Al_2O_3	Liquid phase, 30°C % Na_2O
A	$Al_2O_3.3H_2O$*	0.08	5.5
	$Al_2O_3.3H_2O$*	0.5	9.4
B	$Al_2O_3.3H_2O$*	3.2	21.7
C	$Al_2O_3.3H_2O + 3Al_2O_3.4Na_2O.16H_2O$	4.9	24.6
D	$3Al_2O_3.4Na_2O.16H_2O$	2.1	26.5
	$3Al_2O_3.4Na_2O.16H_2O$	2.5	30.2
	$3Al_2O_3.4Na_2O.16H_2O$	4.3	32.5
E	$3Al_2O_3.4Na_2O.16H_2O + Al_2O_3.4Na_2O.10H_2O$	5.2	34.3
	$Al_2O_3.4Na_2O.10H_2O$	1.9	37.3
F	$Al_2O_3.4Na_2O.10H_2O + Na_2O.3H_2O$	0.1	40.8
	$Na_2O.3H_2O$	0	41.9
	$Al_2O_3(3H_2O)$†	3.07	6.12
	$Al_2O_3(3H_2O)$†	8.50	15.70
	$Al_2O_3.3H_2O$‡	0.4	4.9

* Crystalline form. † Metastable form I. ‡ Metastable form II.

LITERATURE

(For a key to the periodicals see end of volume)

(1) d'Agostino, *73*, **2**: 171; 10. (2) Amadori, *22*, **21 I**: 667; 11. (3) Amadori and Pampanini, *22*, **20 II**: 473; 11. (4) Anderson, *45*, **11**: 327; 19. (5) Anderson and Nestell, *45*, **12**: 243; 20. (6) Ando, *429*, **8**: 283; 25. (6.5) Antropoff and Sommer, *7*, **123**: 161; 26. (7) Applebey and Lane, *4*, **113**: 609; 18. (8) Applebey and Reid, *4*, **121**: 2129; 22. (9) Applebey and Wilkes, *4*, **121**: 337; 22.

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(20) Barre, *34*, **150**: 1321; 10. (21) Barre, *34*, **150**: 1599; 10. (22) Barre, *34*, **151**: 871; 10. (23) Barre, *27*, **11**: 646; 12. (24) Bassett, *93*, **59**: 1; 08. (25) Bassett and Corbet, *4*, **125**: 1660; 24. (26) Bassett and Halton, *4*, **123**: 1291; 23. (27) Bassett and Taylor, *4*, **105**: 1926; 14. (27.5) Baur, *9*, **32**: 428; 26. (28) Bell and Taber, *50*, **10**: 119; 06. (29) Bell and Taber, *50*, **11**: 492; 07.

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(100) Dawkins, *4*, **121**: 776; 22. (101) Dawson, *4*, **113**: 675; 18. (102) Demassieux, *34*, **158**: 183, 702; 14. (103) Demassieux, *34*, **177**: 51; 23. (104) Ditte, *34*, **126**: 694; 98. (105) Dolber, *Diss.*, Erlangen, 1913. (106) Donnan and Thomas, *4*, **99**: 1788; 11. (107) van Dorp, *7*, **73**: 284, 289; 10. (109) Driot, *34*, **150**: 1426; 10.

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(130) Foote, *11*, **26**: 418; 01. (131) Foote, *7*, **46**: 79; 03. (132) Foote, *1*, **33**: 463; 11. (133) Foote, *1*, **34**: 880; 12. (134) Foote, *1*, **37**: 288; 15. (135) Foote, *45*, **11**: 629; 19. (136) Foote, *1*, **45**: 663; 23. (137) Foote and Bristol, *11*, **32**: 246; 04. (138) Foote and Saxton, *4*, **36**: 1695; 14. (139) Foote and Smith, *1*, **46**: 84; 24.

(140) Fox, *4*, **95**: 878; 09. (141) Freeth, *62*, **223**: 35; 22. (142) Freeth, *Diss.*, Leiden, 1924. (143) Fujimura, *429*, **1**: 63; 14. (144) Garran, *4*, **1926**: 848. (145) Gilbert, *4*, **127**: 1541; 25. (146) Gilbert, Buckley and Masson, *4*, **121**: 1934; 22. (147) Glasstone, *4*, **121**: 58; 22. (148) Glasstone and Riggs, *4*, **127**: 2846; 25. (149) Glasstone and Saunders, *4*, **123**: 2134; 23.

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(160) Hammick, Goadby and Booth, *4*, **117**: 1589; 20. (161) Harkins and Paine, *1*, **38**: 2709; 16. (162) Harkins and Paine, *1*, **41**: 1155; 19. (163) Harkins and Pearce, *1*, **38**: 2679; 16. (164) Harkins and Pearce, *1*, **38**: 2714; 16. (165) Hartley, Drugman, Vlieland and Bourdillon, *4*, **103**: 1747; 13. (166) Hauser, *93*, **45**: 185; 05. (167) Hauser, *93*, **54**: 196; 07. (168) Hauser and Wirth, *93*, **78**: 75; 12. (169) Hayami, *429*, **4**: 359; 21.

(170) van der Heide, *7*, **12**: 416; 93. (171) Hempel and Tedesco, *92*, **24**: 2459; 11. (172) Henderson and Taylor, *50*, **20**: 663; 16. (173) Hendricks, *50*, **30**: 248; 26. (174) Herold, *9*, **11**: 417; 05. (175) Herz, *93*, **33**: 353; 03. (176) Herz, *93*, **67**: 365; 10. (177) Herz, *93*, **68**: 69; 10. (178) Herz, *93*, **68**: 165; 10. (179) Herz, *93*, **73**: 274; 11.

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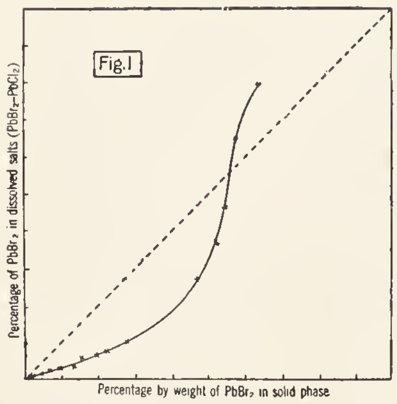


Fig. 1
Percentage of PbBr₂ in dissolved salts (PbBr₂–PbCl₂)
Percentage by weight of PbBr₂ in solid phase

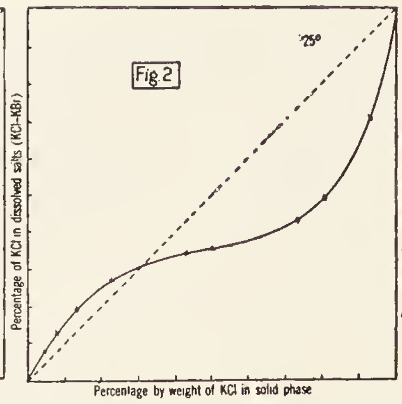


Fig 2
25°
Percentage of KCl in dissolved salts (KCl–KBr)
Percentage by weight of KCl in solid phase

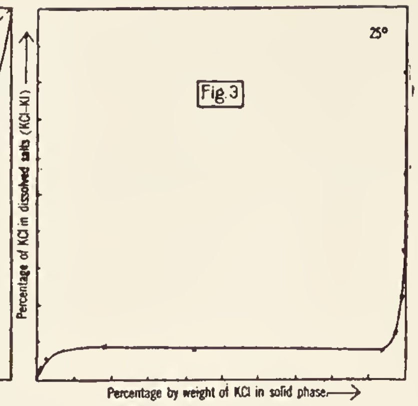


Fig. 3
25°
Percentage of KCl in dissolved salts (KCl–KI)
Percentage by weight of KCl in solid phase

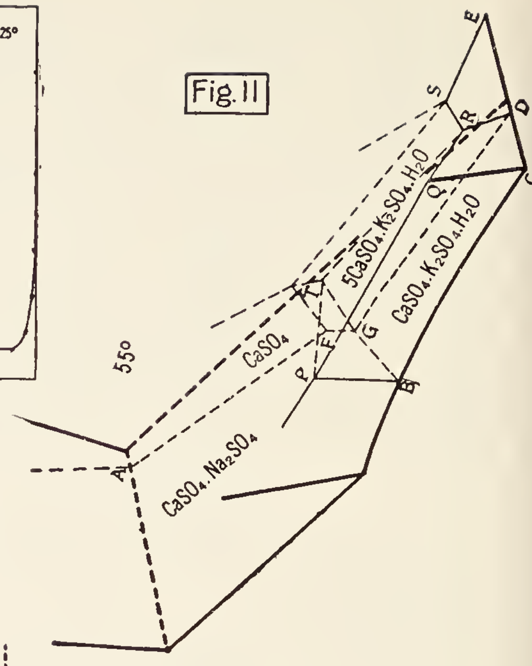


Fig. 11
55°
CaSO₄
CaSO₄.Na₂SO₄
5CaSO₄.K₂SO₄.H₂O
CaSO₄.K₂SO₄.H₂O

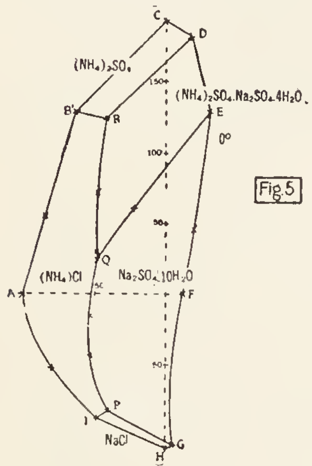


Fig 5
0°
(NH₄)₂SO₄
(NH₄)₂SO₄.Na₂SO₄.4H₂O
(NH₄)Cl
Na₂SO₄.10H₂O
NaCl

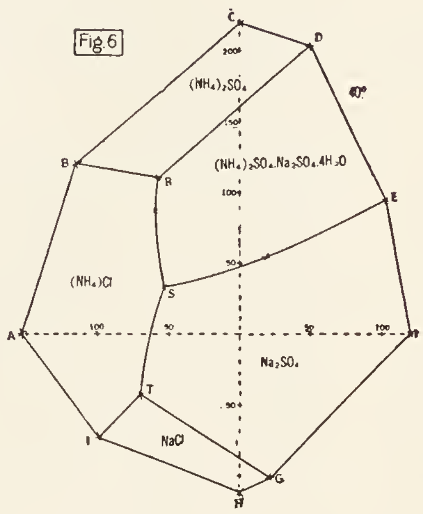


Fig 6
40°
(NH₄)₂SO₄
(NH₄)₂SO₄.Na₂SO₄.4H₂O
(NH₄)Cl
Na₂SO₄
NaCl

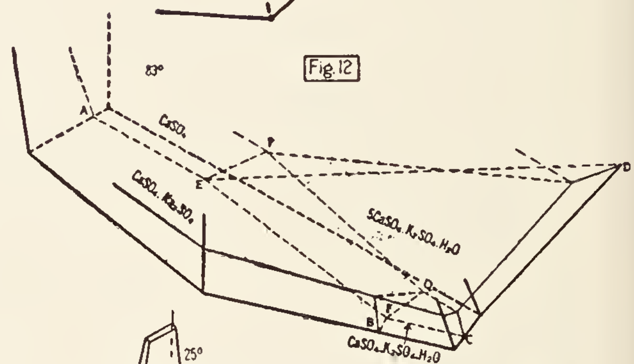


Fig. 12
83°
CaSO₄
CaSO₄.Na₂SO₄
5CaSO₄.K₂SO₄.H₂O
CaSO₄.K₂SO₄.H₂O

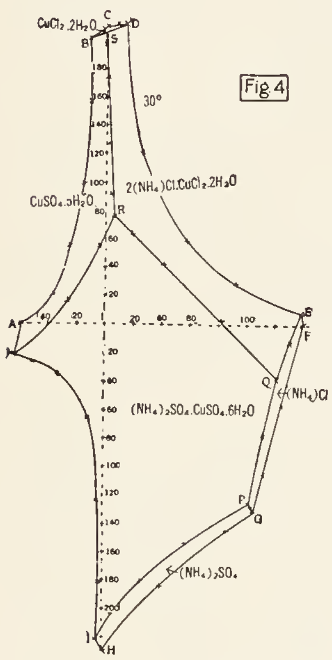


Fig 4
30°
CuCl₂.2H₂O
CuSO₄.5H₂O
2(NH₄)Cl.CuCl₂.2H₂O
(NH₄)₂SO₄.CuSO₄.6H₂O
(NH₄)Cl
(NH₄)₂SO₄

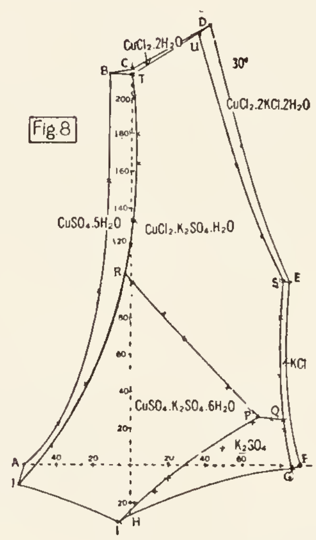


Fig 8
30°
CuCl₂.2H₂O
CuCl₂.2KCl.2H₂O
CuSO₄.5H₂O
CuCl₂.K₂SO₄.H₂O
CuSO₄.K₂SO₄.6H₂O
KCl
K₂SO₄

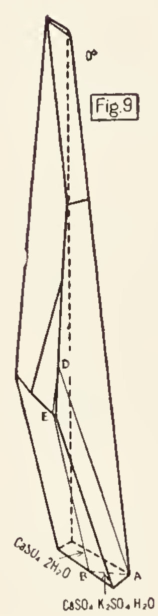


Fig. 9
0°
CaSO₄.2H₂O
CaSO₄.K₂SO₄.H₂O

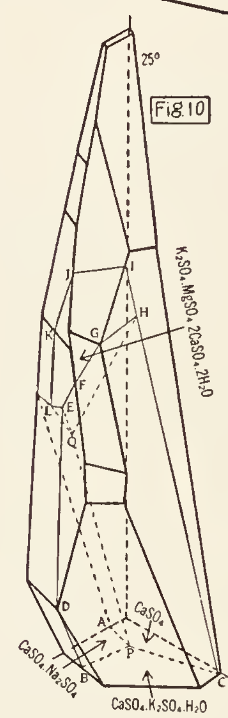


Fig. 10
25°
K₂SO₄.MgSO₄.2CaSO₄.2H₂O
CaSO₄
CaSO₄.Na₂SO₄
CaSO₄.K₂SO₄.H₂O

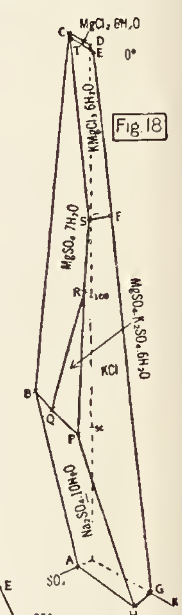


Fig. 18
0°
MgCl₂.6H₂O
KMgCl₃.6H₂O
MgSO₄.7H₂O
MgSO₄.K₂SO₄.6H₂O
KCl
Na₂SO₄.10H₂O

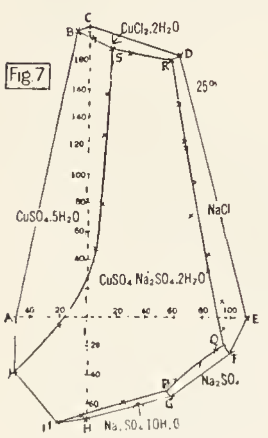


Fig 7
25°
CuCl₂.2H₂O
CuSO₄.5H₂O
CuSO₄.Na₂SO₄.2H₂O
NaCl
Na₂SO₄
Na₂SO₄.10H₂O

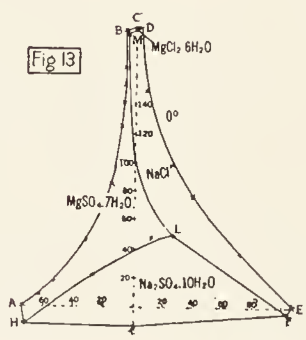


Fig 13
0°
MgCl₂.6H₂O
MgSO₄.7H₂O
NaCl
Na₂SO₄.10H₂O

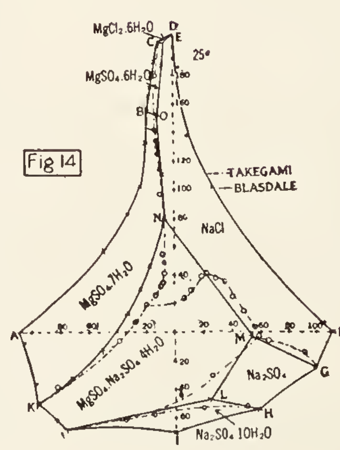


Fig 14
25°
MgCl₂.6H₂O
MgSO₄.6H₂O
TAKEGAMI
BLASDALE
NaCl
MgSO₄.7H₂O
MgSO₄.Na₂SO₄.4H₂O
Na₂SO₄
Na₂SO₄.10H₂O

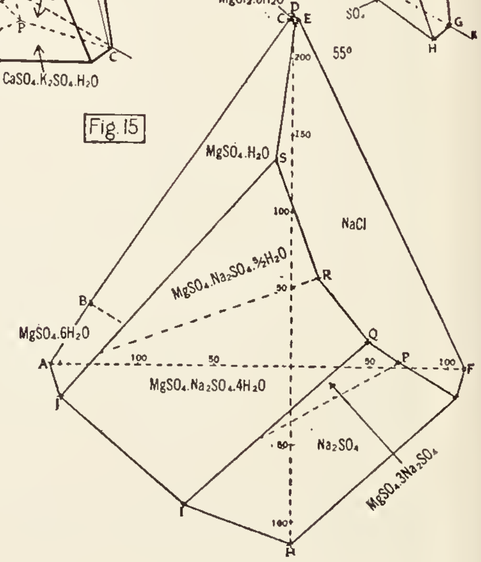


Fig. 15
55°
MgCl₂.6H₂O
MgSO₄.H₂O
NaCl
MgSO₄.Na₂SO₄.2½H₂O
MgSO₄.6H₂O
MgSO₄.Na₂SO₄.4H₂O
Na₂SO₄
MgSO₄.3Na₂SO₄

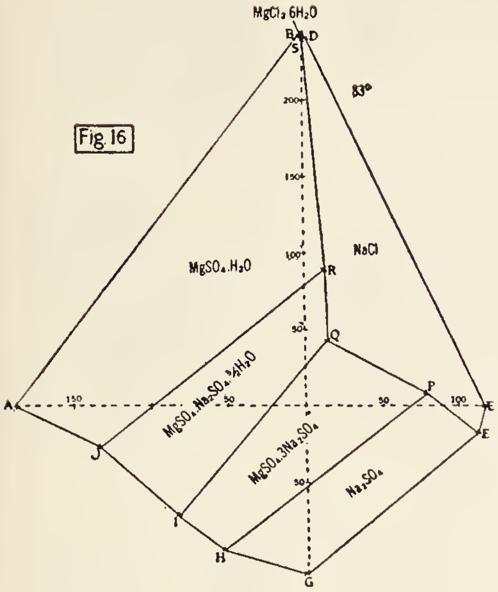


Fig. 16
$MgCl_2.6H_2O$
83°
$MgSO_4.H_2O$
NaCl
$MgSO_4.Na_2SO_4.2\frac{1}{2}H_2O$
$MgSO_4.3Na_2SO_4$
Na_2SO_4

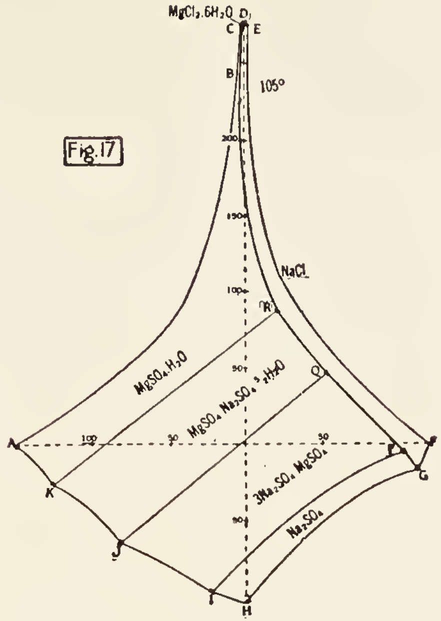


Fig. 17
$MgCl_2.6H_2O$
105°
NaCl
$MgSO_4.H_2O$
$MgSO_4.Na_2SO_4.2\frac{1}{2}H_2O$
$3Na_2SO_4.MgSO_4$
Na_2SO_4

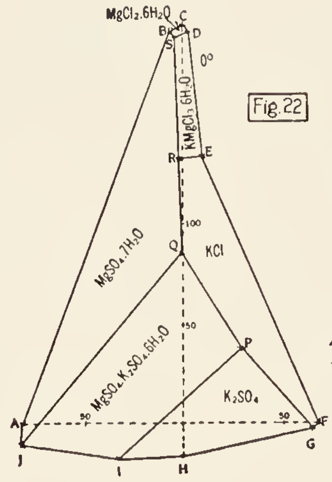


Fig. 22
$MgCl_2.6H_2O$
0°
$KMgCl_3.6H_2O$
$MgSO_4.7H_2O$
KCl
$MgSO_4.K_2SO_4.6H_2O$
K_2SO_4

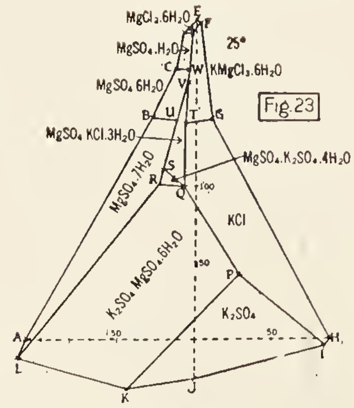


Fig. 23
$MgCl_2.6H_2O$
25°
$MgSO_4.H_2O$
$KMgCl_3.6H_2O$
$MgSO_4.6H_2O$
$MgSO_4.KCl.3H_2O$
$MgSO_4.K_2SO_4.4H_2O$
$MgSO_4.7H_2O$
KCl
$K_2SO_4.MgSO_4.6H_2O$
K_2SO_4

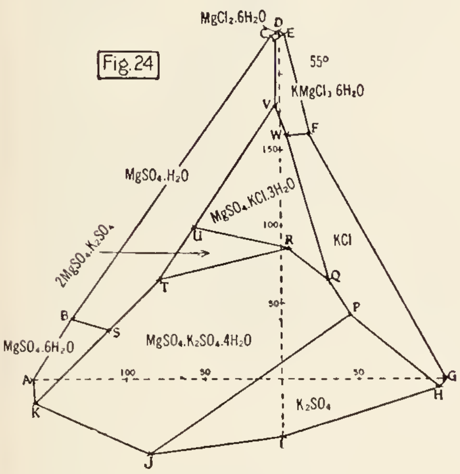


Fig. 24
$MgCl_2.6H_2O$
55°
$KMgCl_3.6H_2O$
$MgSO_4.H_2O$
$MgSO_4.KCl.3H_2O$
$2MgSO_4.K_2SO_4$
KCl
$MgSO_4.6H_2O$
$MgSO_4.K_2SO_4.4H_2O$
K_2SO_4

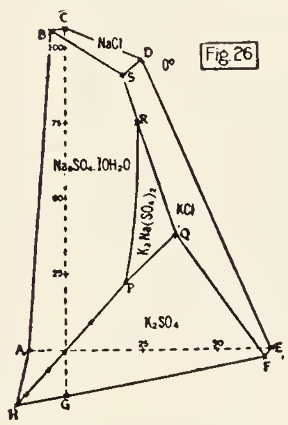


Fig. 26
NaCl
0°
$Na_2SO_4.10H_2O$
KCl
$K_3Na(SO_4)_2$
K_2SO_4

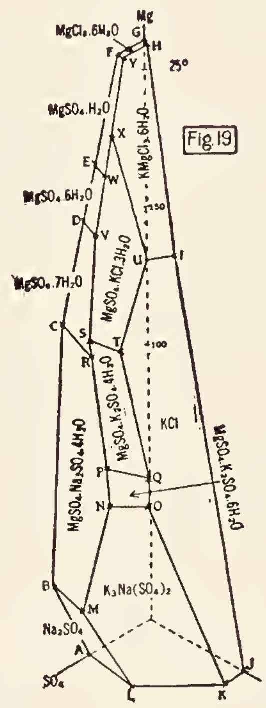


Fig. 19
Mg
$MgCl_2.6H_2O$
25°
$MgSO_4.H_2O$
$MgSO_4.6H_2O$
$KMgCl_3.6H_2O$
$MgSO_4.7H_2O$
$MgSO_4.KCl.3H_2O$
$MgSO_4.K_2SO_4.4H_2O$
KCl
$MgSO_4.Na_2SO_4.4H_2O$
$MgSO_4.K_2SO_4.6H_2O$
$K_3Na(SO_4)_2$
Na_2SO_4
SO_4

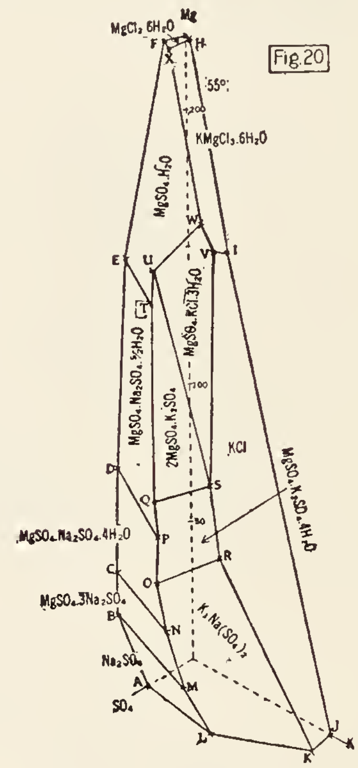


Fig. 20
$MgCl_2.6H_2O$
Mg
55°
$KMgCl_3.6H_2O$
$MgSO_4.H_2O$
$MgSO_4.KCl.3H_2O$
$MgSO_4.Na_2SO_4.2\frac{1}{2}H_2O$
$2MgSO_4.K_2SO_4$
KCl
$MgSO_4.K_2SO_4.4H_2O$
$MgSO_4.Na_2SO_4.4H_2O$
$MgSO_4.3Na_2SO_4$
$K_3Na(SO_4)_2$
Na_2SO_4
SO_4

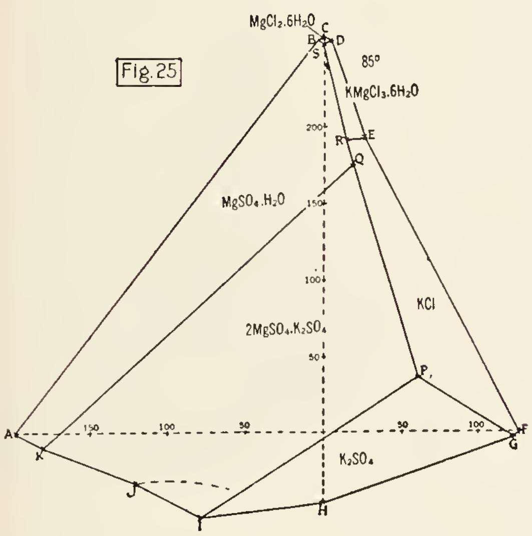


Fig. 25
$MgCl_2.6H_2O$
85°
$KMgCl_3.6H_2O$
$MgSO_4.H_2O$
KCl
$2MgSO_4.K_2SO_4$
K_2SO_4

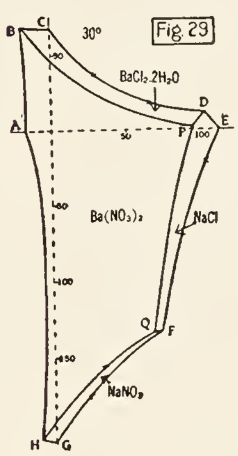


Fig. 29
30°
$BaCl_2.2H_2O$
$Ba(NO_3)_2$
NaCl
$NaNO_3$

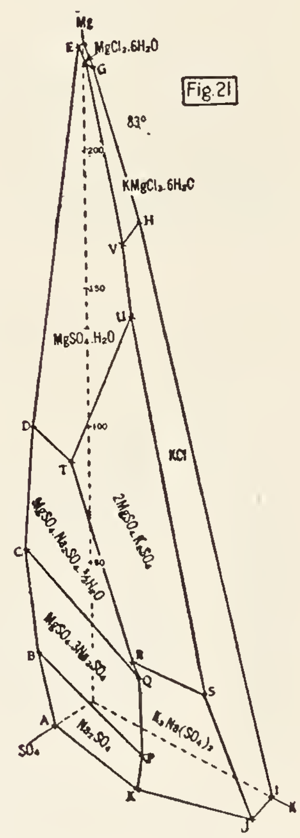


Fig. 21
Mg
$MgCl_2.6H_2O$
83°
$KMgCl_3.6H_2O$
$MgSO_4.H_2O$
KCl
$2MgSO_4.K_2SO_4$
$MgSO_4.Na_2SO_4.2\frac{1}{2}H_2O$
$MgSO_4.3Na_2SO_4$
Na_2SO_4
$K_3Na(SO_4)_2$
SO_4

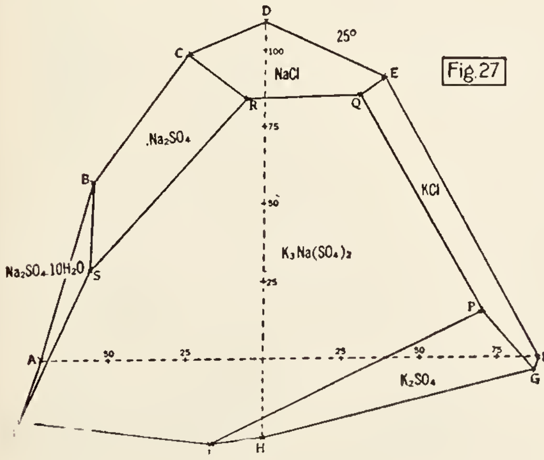


Fig. 27
25°
NaCl
Na_2SO_4
KCl
$K_3Na(SO_4)_2$
$Na_2SO_4.10H_2O$
K_2SO_4

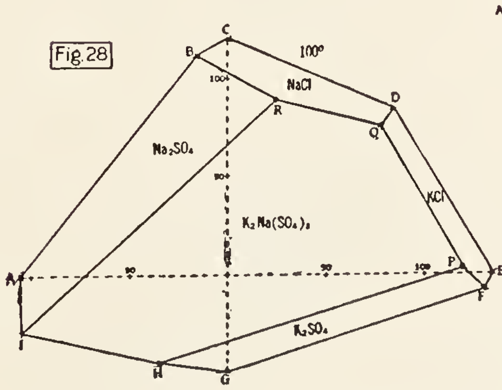


Fig. 28
100°
NaCl
Na_2SO_4
KCl
$K_3Na(SO_4)_2$
K_2SO_4

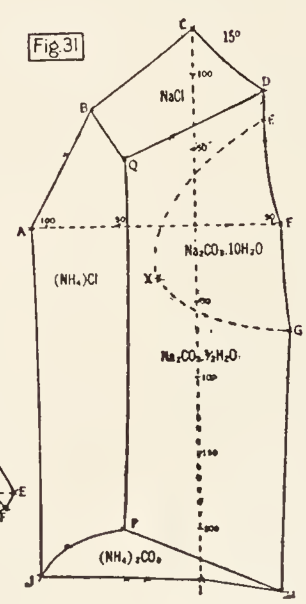


Fig. 31
15°
NaCl
$Na_2CO_3.10H_2O$
$(NH_4)Cl$
$Na_2CO_3.7H_2O$
$(NH_4)_2CO_3$

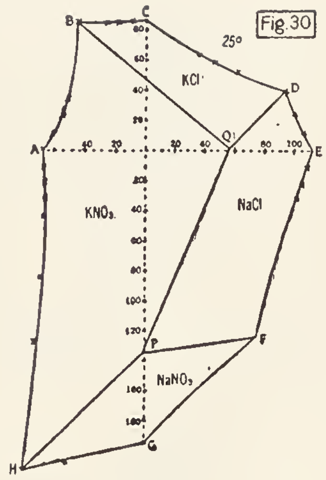


Fig.30
25°
KCl
KNO₃
NaCl
NaNO₃

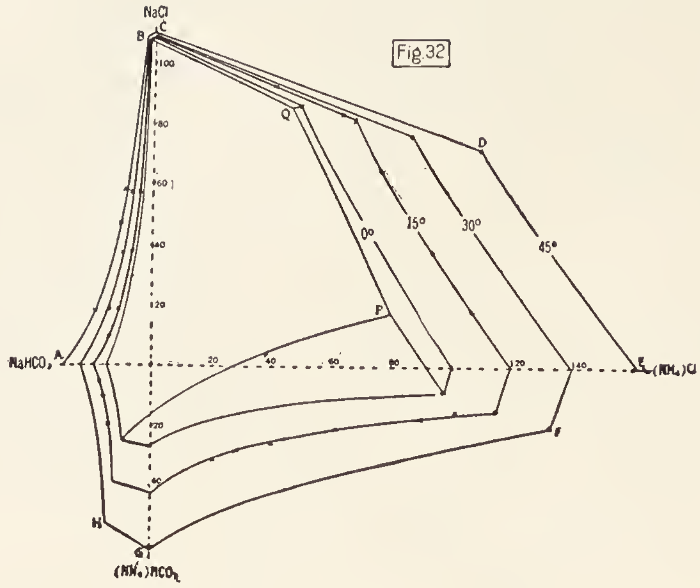


Fig.32
NaCl
NaHCO₃
(NH₄)Cl
(NH₄)HCO₃
0°
15°
30°
45°

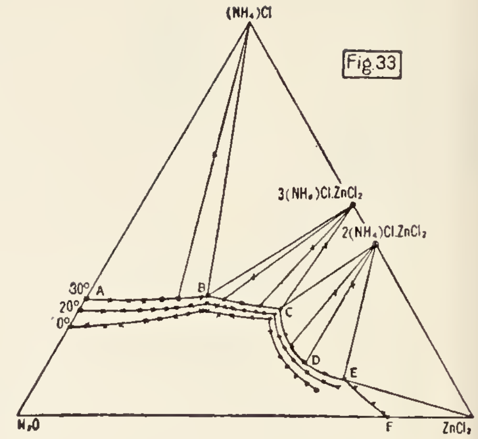


Fig.33
(NH₄)Cl
3(NH₄)Cl.ZnCl₂
2(NH₄)Cl.ZnCl₂
30°
20°
0°
H₂O
ZnCl₂

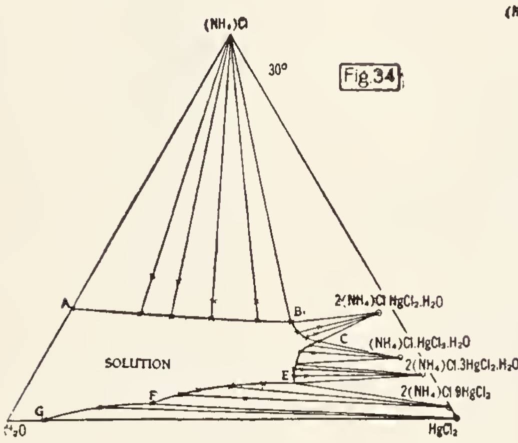


Fig.34
(NH₄)Cl
30°
2(NH₄)Cl.HgCl₂.H₂O
(NH₄)Cl.HgCl₂.H₂O
2(NH₄)Cl.3HgCl₂.H₂O
2(NH₄)Cl.9HgCl₂
SOLUTION
HgCl₂

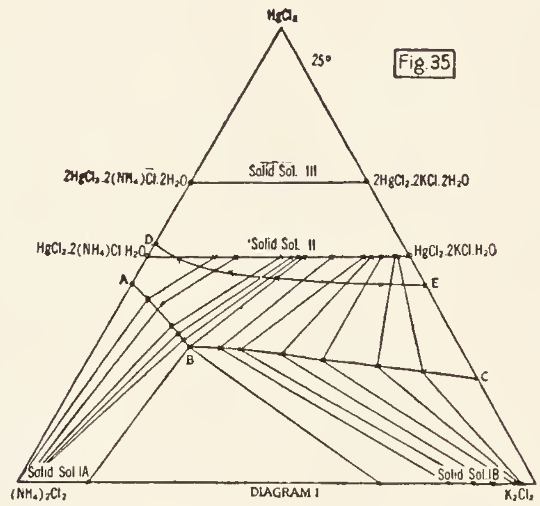


Fig.35
HgCl₂
25°
2HgCl₂.2(NH₄)Cl.2H₂O
Solid Sol. III
2HgCl₂.2KCl.2H₂O
HgCl₂.2(NH₄)Cl.H₂O
Solid Sol. II
HgCl₂.2KCl.H₂O
Solid Sol IA
Solid Sol IB
(NH₄)₂Cl₂
DIAGRAM I
K₂Cl₂

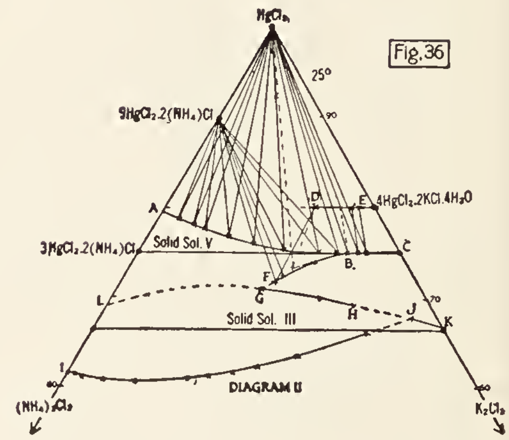


Fig.36
HgCl₂
25°
9HgCl₂.2(NH₄)Cl
4HgCl₂.2KCl.4H₂O
3HgCl₂.2(NH₄)Cl
Solid Sol. V
Solid Sol. III
DIAGRAM II
(NH₄)₂Cl₂
K₂Cl₂

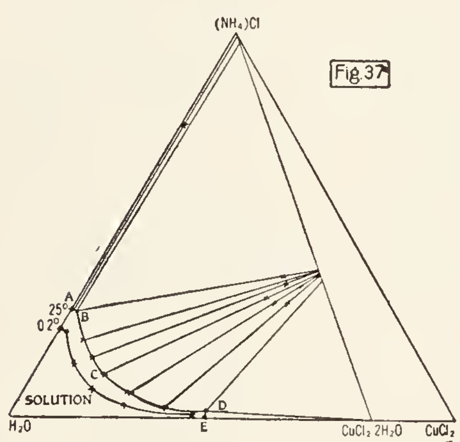


Fig.37
(NH₄)Cl
25°
0 2°
SOLUTION
H₂O
CuCl₂.2H₂O
CuCl₂

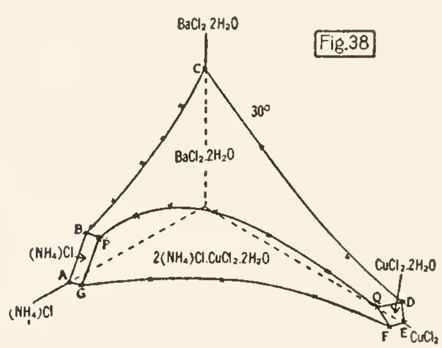


Fig.38
BaCl₂.2H₂O
30°
BaCl₂.2H₂O
(NH₄)Cl
2(NH₄)Cl.CuCl₂.2H₂O
CuCl₂.2H₂O
(NH₄)Cl
CuCl₂

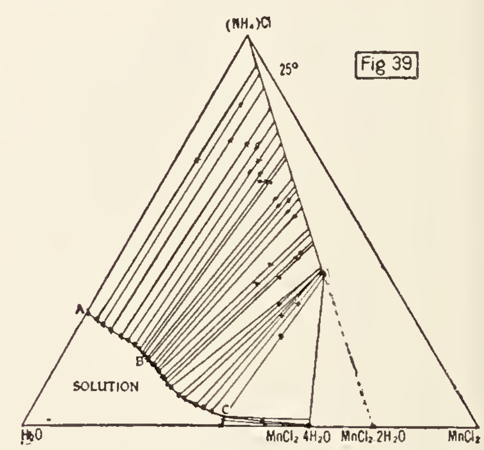


Fig 39
(NH₄)Cl
25°
SOLUTION
H₂O
MnCl₂.4H₂O
MnCl₂.2H₂O
MnCl₂

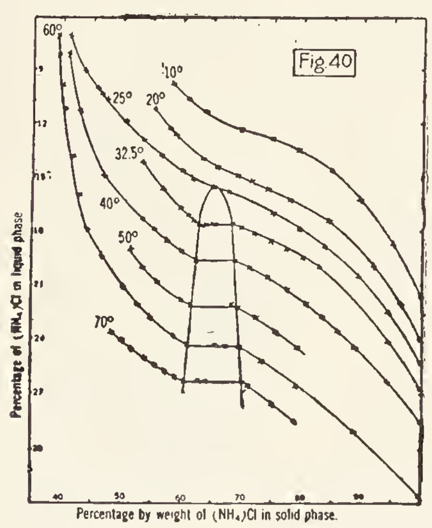


Fig.40
60°
10°
25°
20°
32.5°
40°
50°
70°
Percentage of (NH₄)Cl in liquid phase
Percentage by weight of (NH₄)Cl in solid phase.

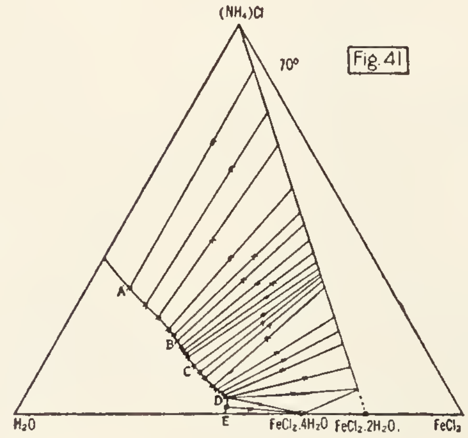


Fig.41
(NH₄)Cl
70°
H₂O
FeCl₂.4H₂O
FeCl₂.2H₂O.
FeCl₂

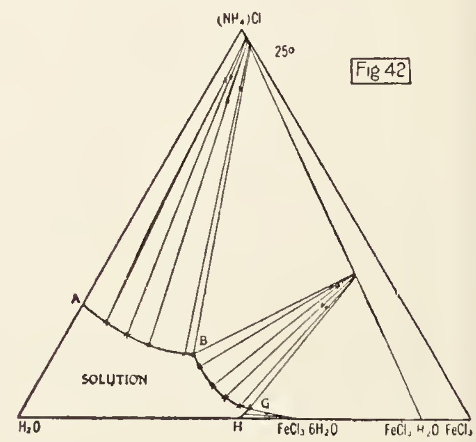


Fig 42
(NH₄)Cl
25°
SOLUTION
H₂O
FeCl₃.6H₂O
FeCl₃

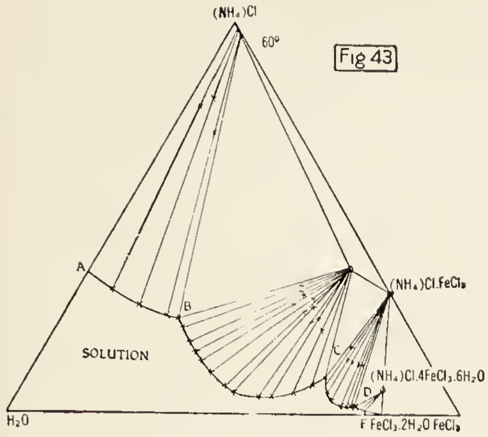


Fig 43

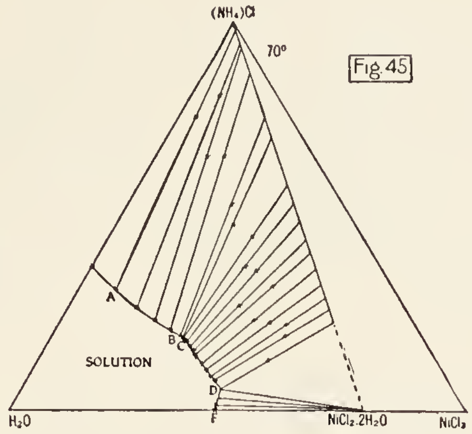


Fig 45

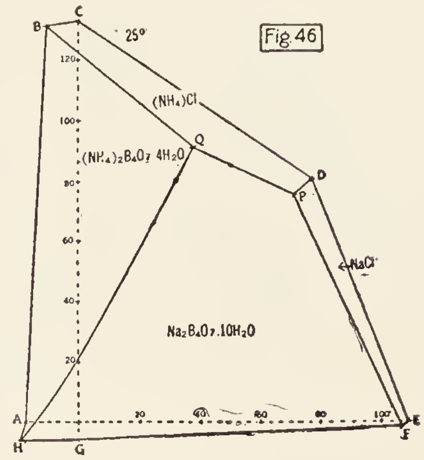


Fig 46

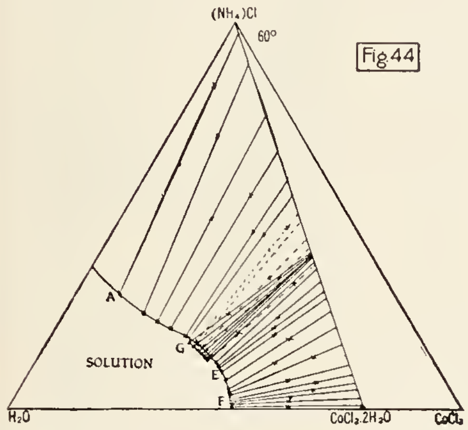


Fig 44

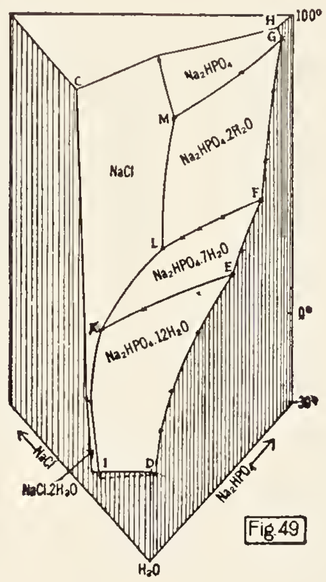


Fig 49

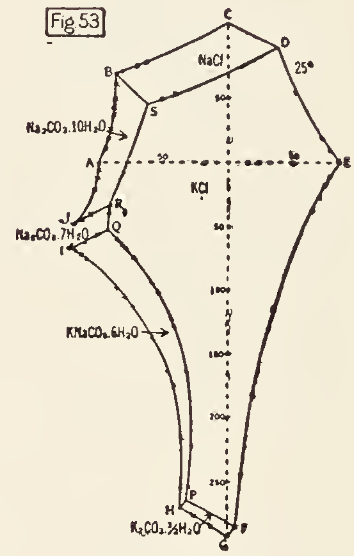


Fig 53

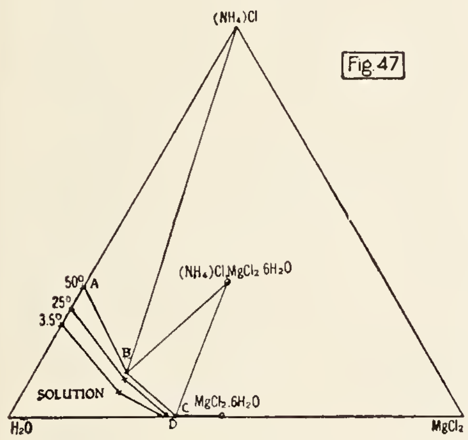


Fig 47

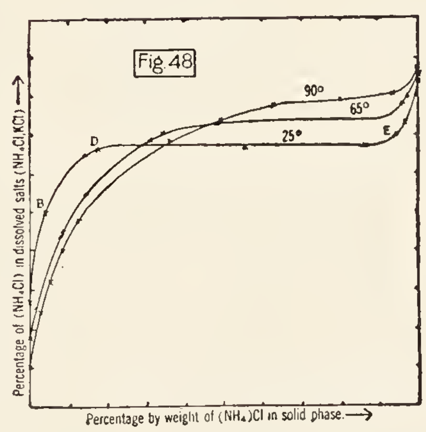


Fig 48

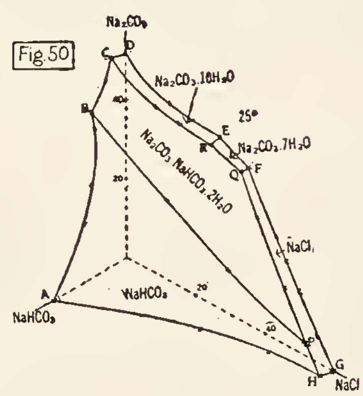


Fig 50

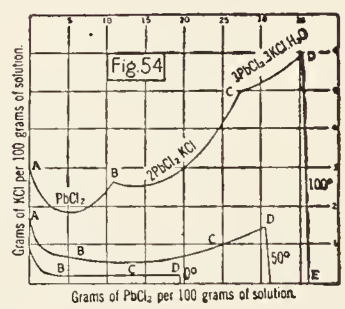


Fig 54

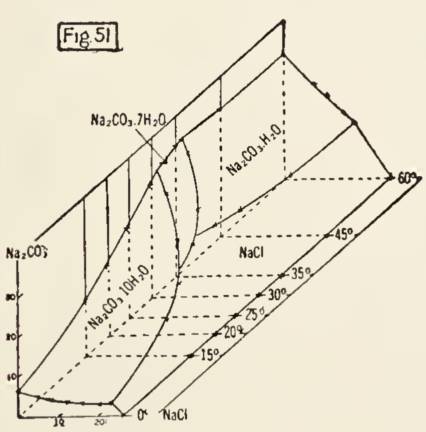


Fig 51

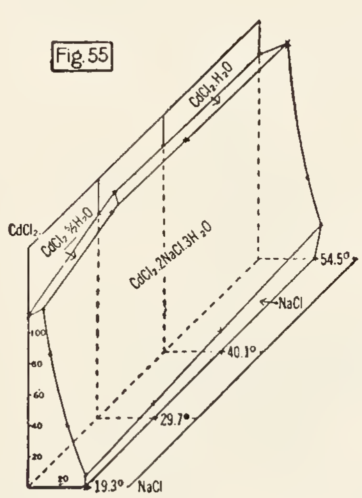


Fig 55

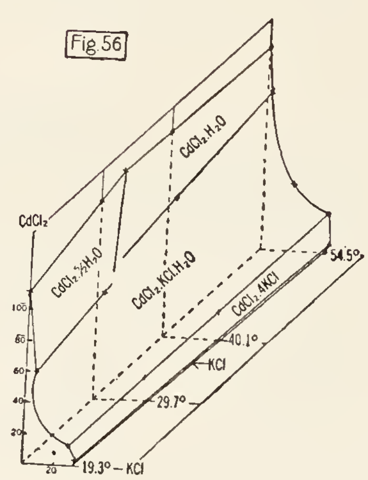


Fig 56

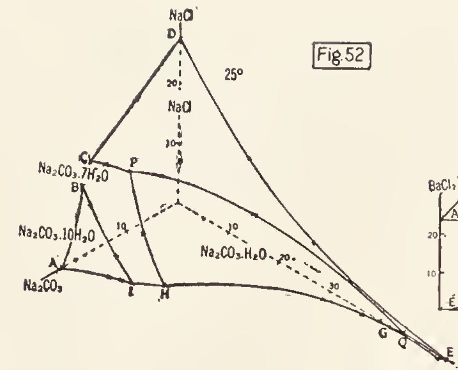


Fig. 52

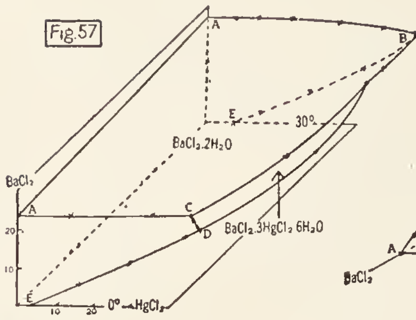


Fig. 57

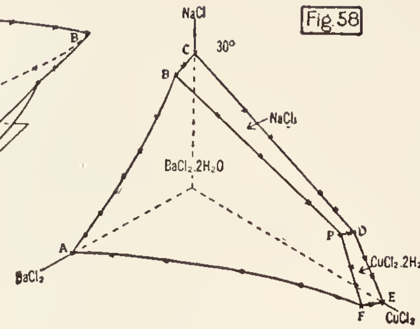


Fig. 58

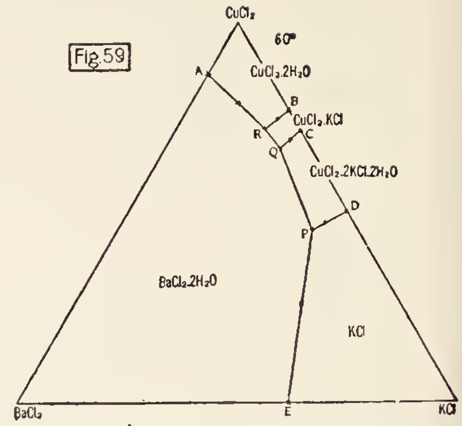


Fig. 59

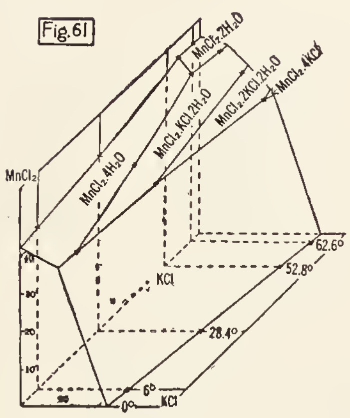


Fig. 61

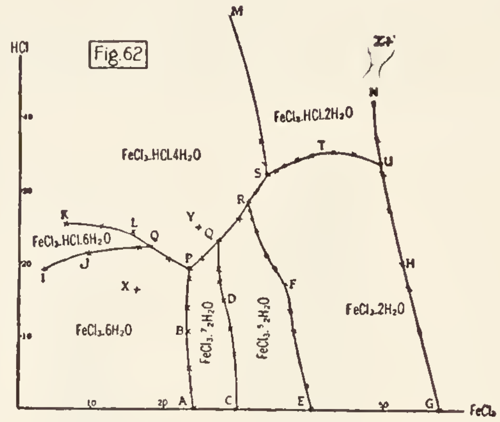


Fig. 62

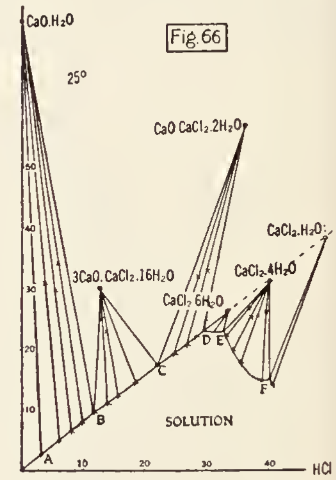


Fig. 66

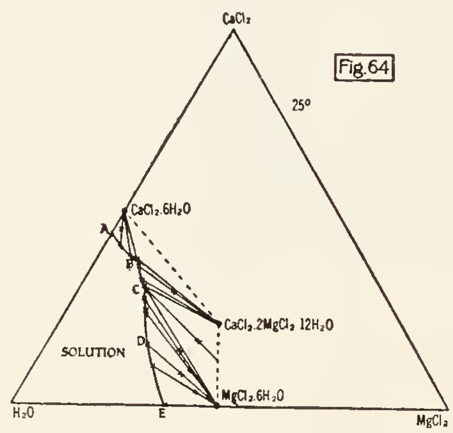


Fig. 64

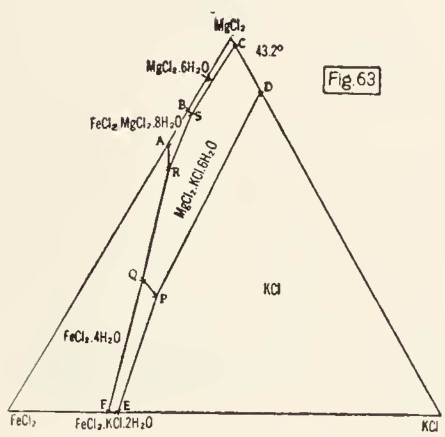


Fig. 63

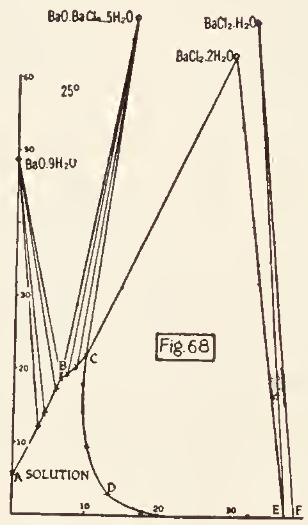


Fig. 68

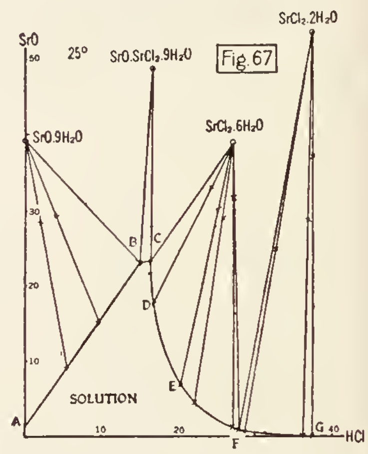


Fig. 67

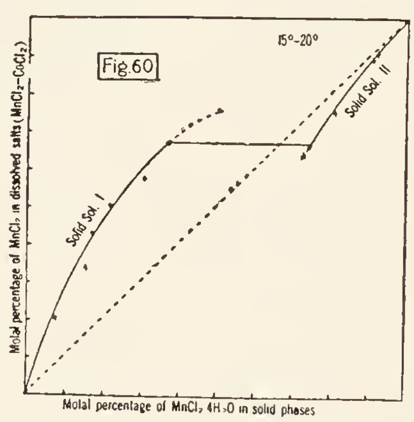


Fig. 60

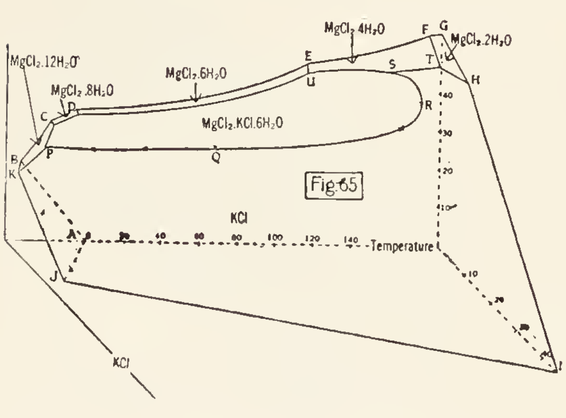


Fig. 65

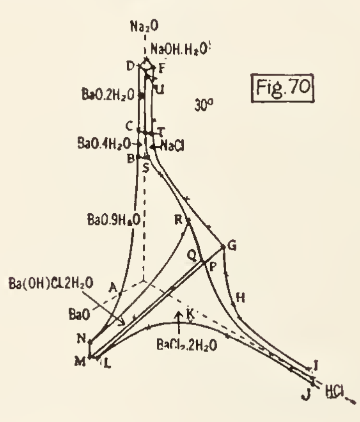


Fig. 70

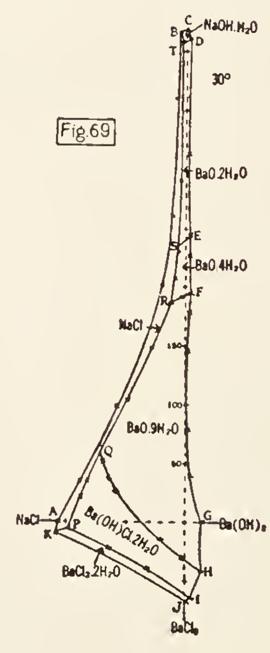


Fig. 69

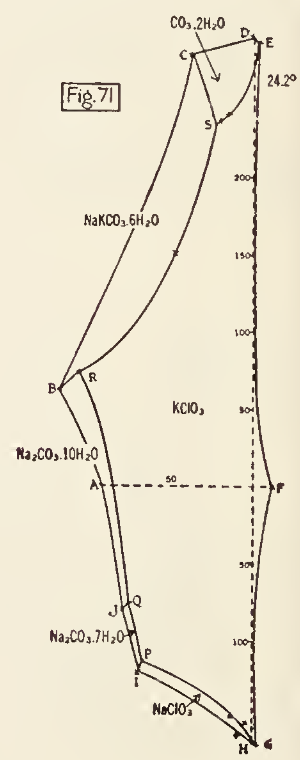


Fig. 71

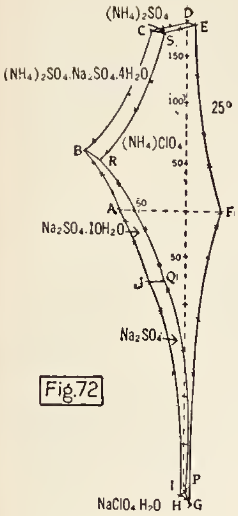


Fig. 72

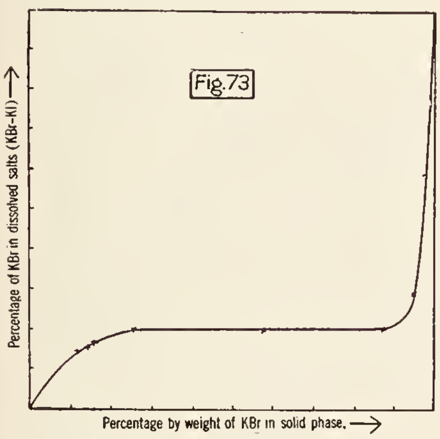


Fig. 73

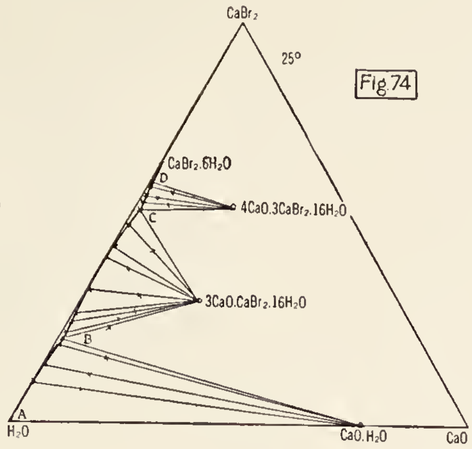


Fig. 74

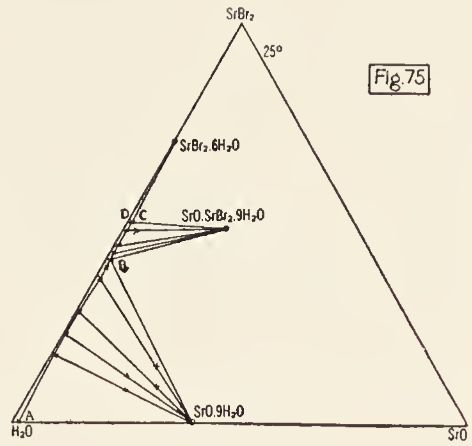


Fig. 75

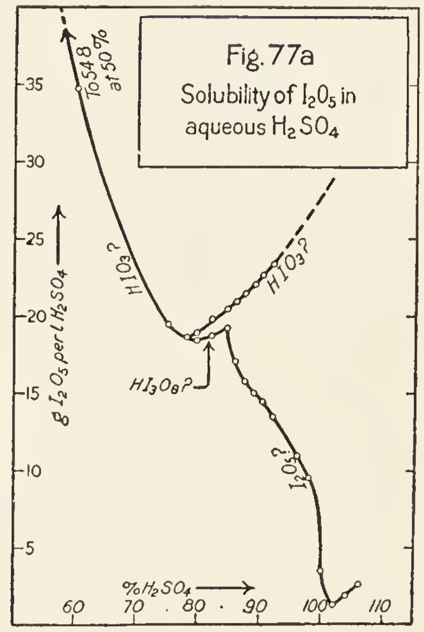


Fig. 77a

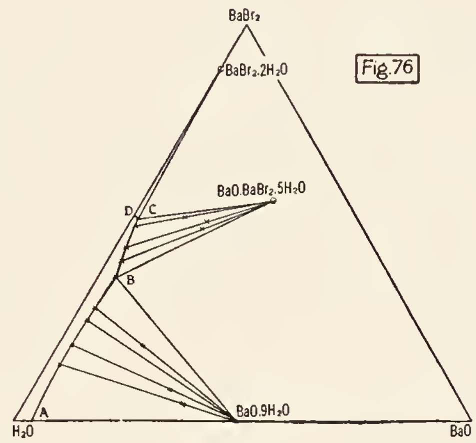


Fig. 76

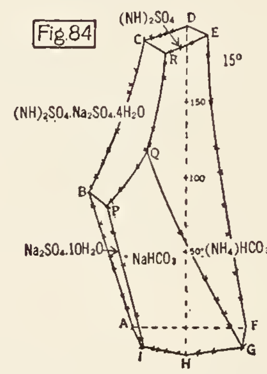


Fig. 84

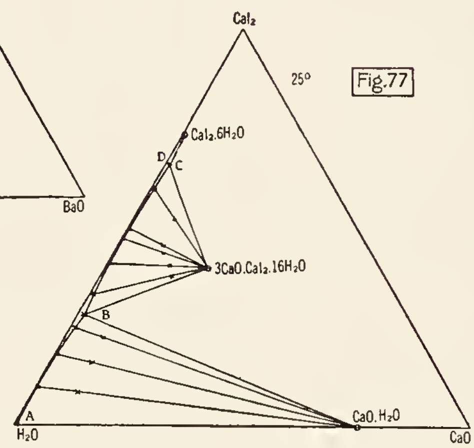


Fig. 77

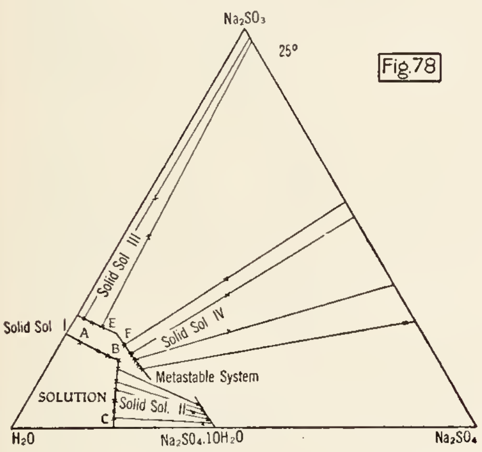


Fig. 78

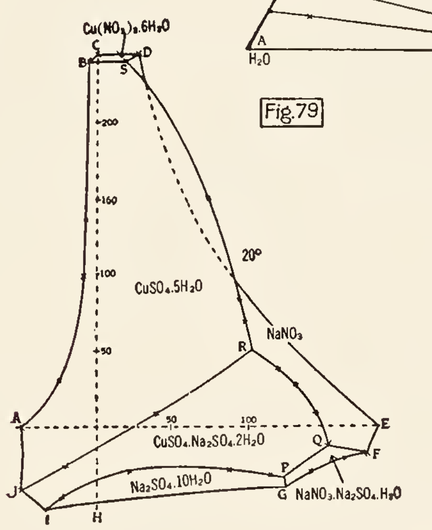


Fig. 79

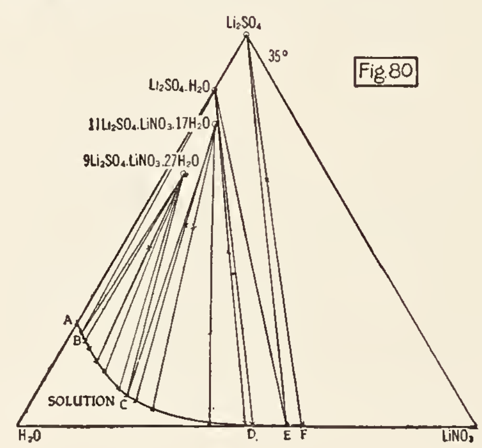


Fig. 80

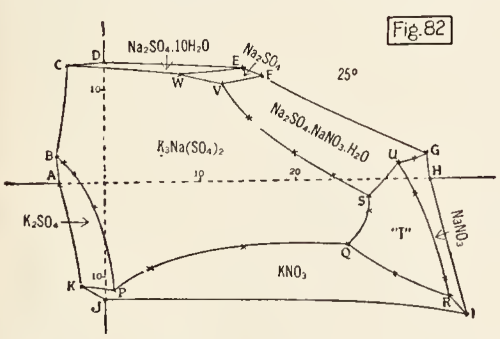


Fig. 82

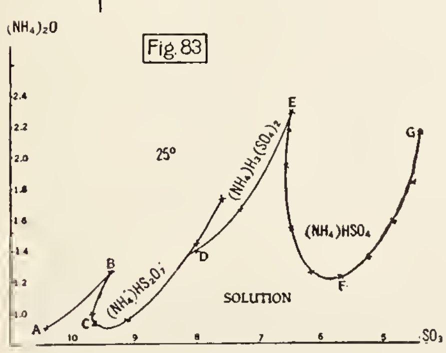


Fig. 83

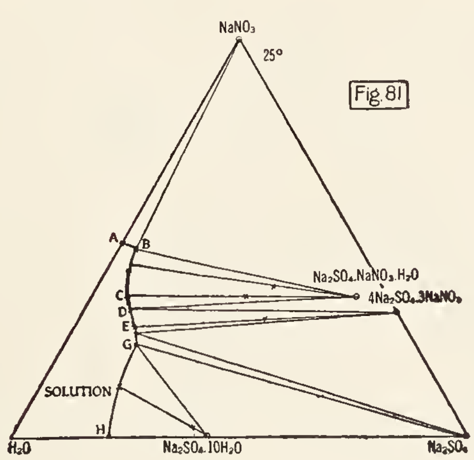


Fig. 81

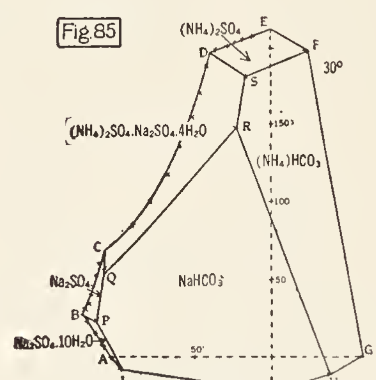


Fig. 85

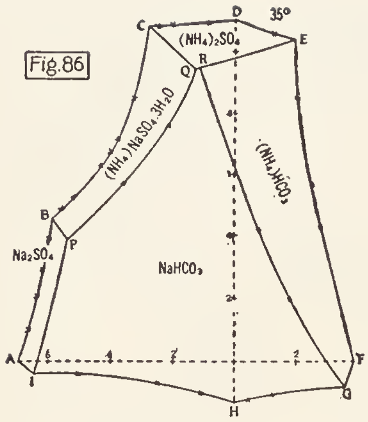


Fig.86

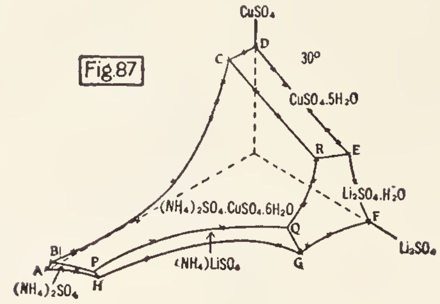


Fig.87

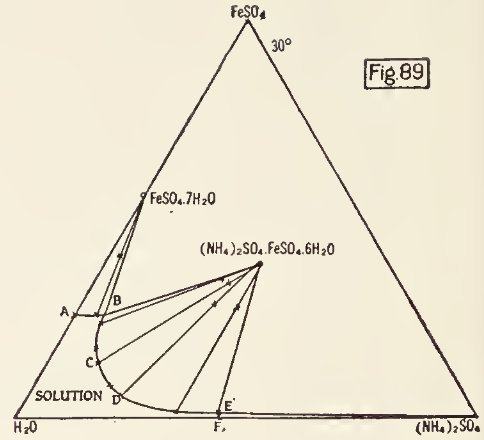


Fig.89

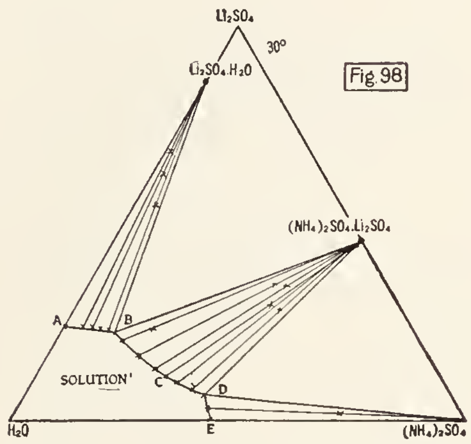


Fig.98

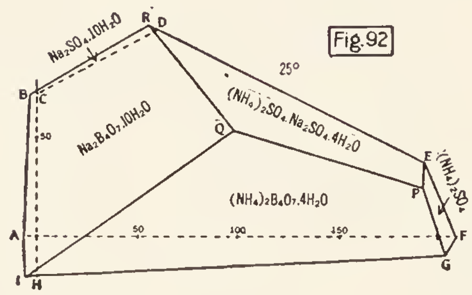


Fig.92

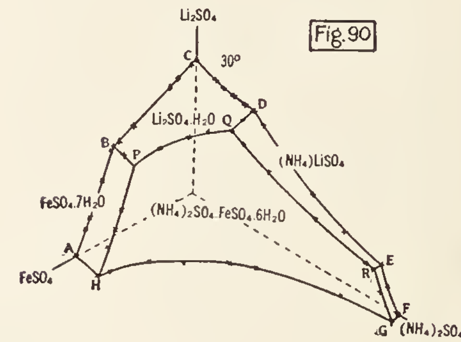


Fig.90

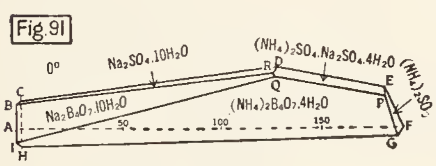


Fig.91

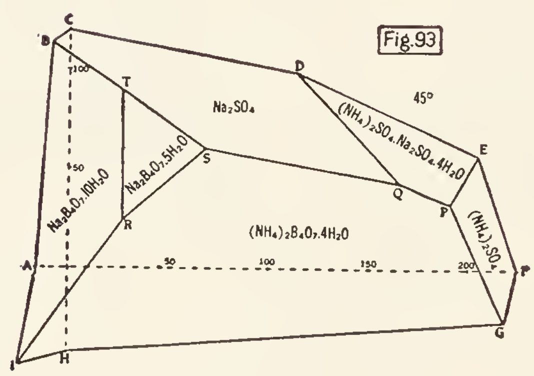


Fig.93

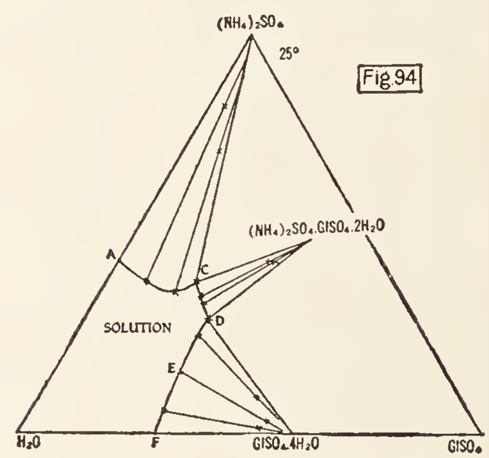


Fig.94

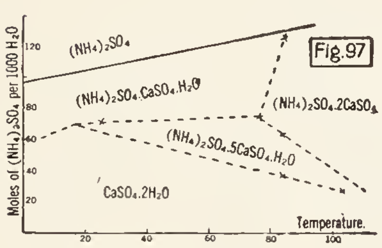


Fig.97

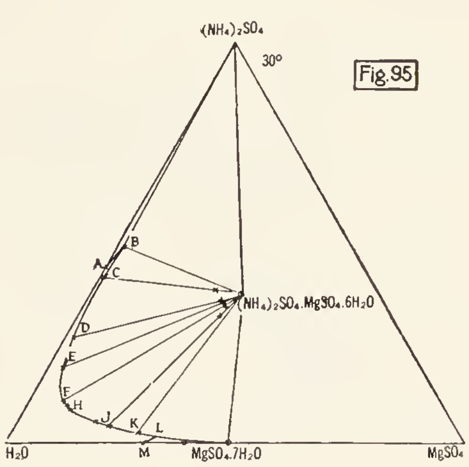


Fig.95

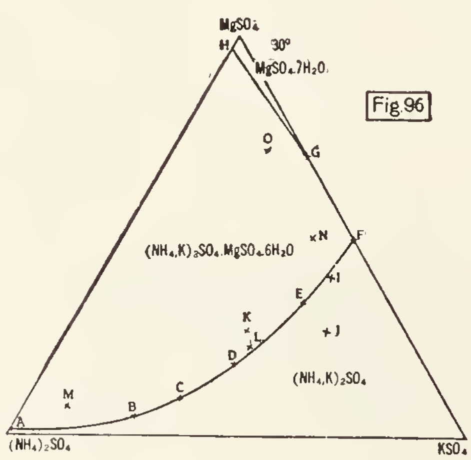


Fig.96

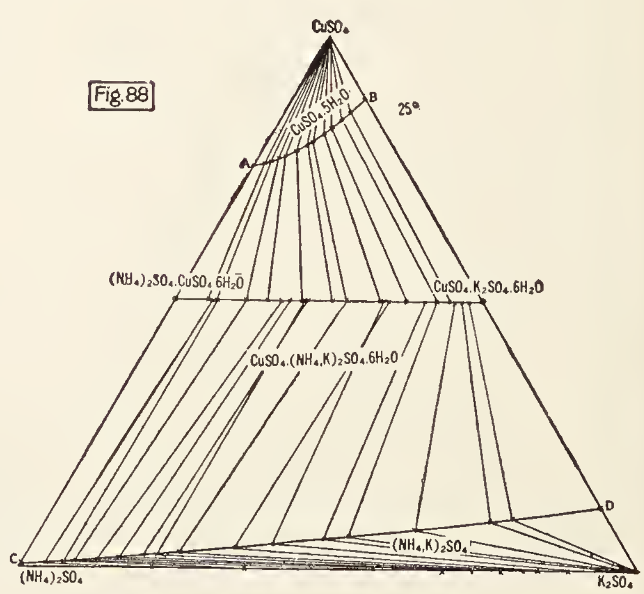


Fig.88

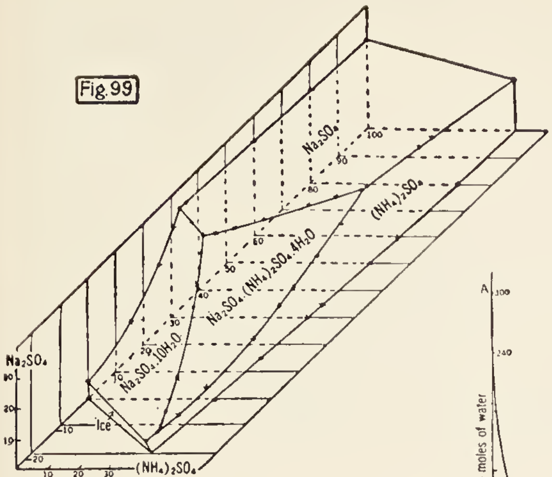


Fig. 99
Na_2SO_4
$(NH_4)_2SO_4$
$Na_2SO_4 \cdot 10H_2O$
$Na_2SO_4 \cdot (NH_4)_2SO_4 \cdot 4H_2O$
Ice

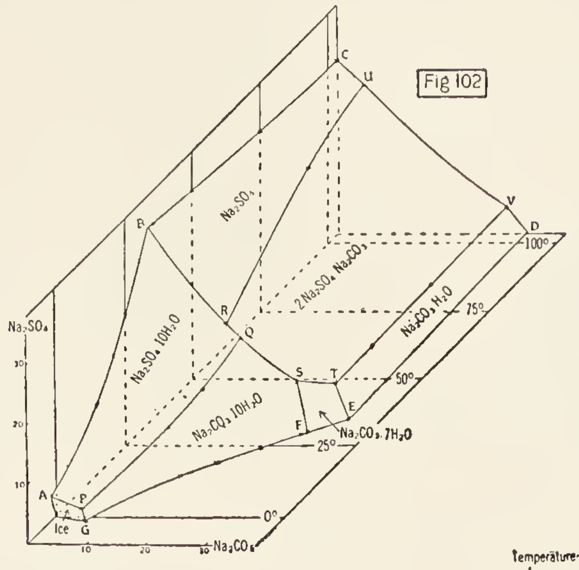


Fig. 102
Na_2SO_4
$Na_2SO_4 \cdot 10H_2O$
$2Na_2SO_4 \cdot Na_2CO_3$
$Na_2CO_3 \cdot H_2O$
$Na_2CO_3 \cdot 10H_2O$
$Na_2CO_3 \cdot 7H_2O$
Na_2CO_3
Ice

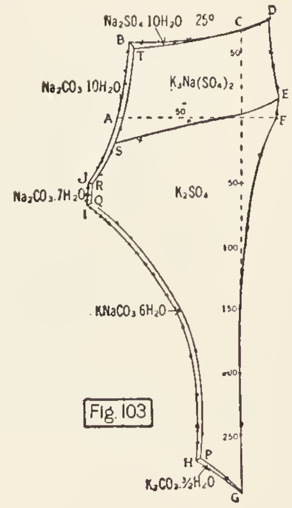


Fig. 103
$Na_2SO_4 \cdot 10H_2O$ 25°
$Na_2CO_3 \cdot 10H_2O$
$K_3Na(SO_4)_2$
$Na_2CO_3 \cdot 7H_2O$
K_2SO_4
$KNaCO_3 \cdot 6H_2O$
$K_2CO_3 \cdot \frac{3}{2}H_2O$

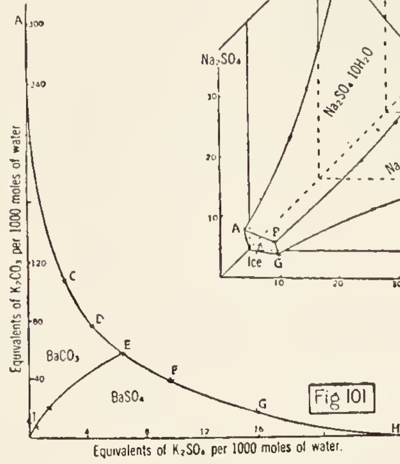


Fig. 101
Equivalents of K_2CO_3 per 1000 moles of water
Equivalents of K_2SO_4 per 1000 moles of water.
$BaCO_3$
$BaSO_4$

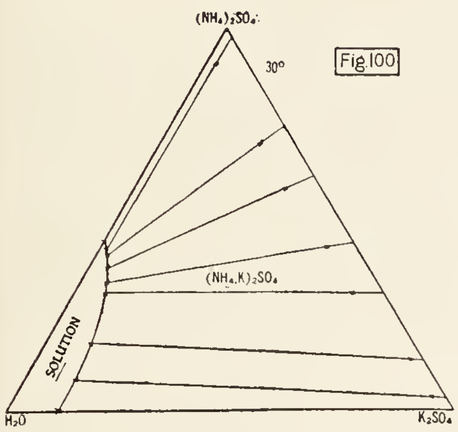


Fig. 100
$(NH_4)_2SO_4$
30°
$(NH_4, K)_2SO_4$
SOLUTION
H_2O
K_2SO_4

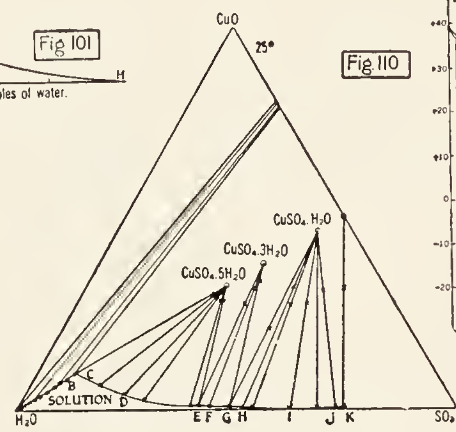


Fig. 110
CuO
25°
$CuSO_4 \cdot H_2O$
$CuSO_4 \cdot 3H_2O$
$CuSO_4 \cdot 5H_2O$
SOLUTION
H_2O
SO_3

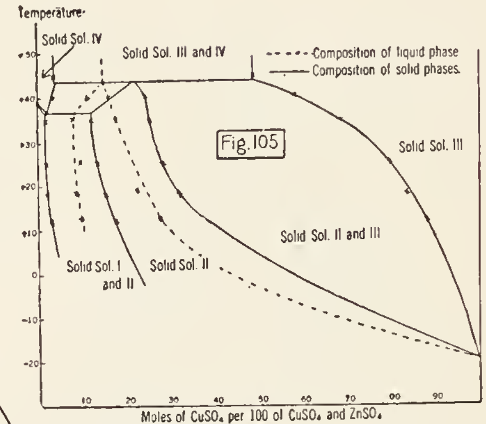


Fig. 105
Temperature
Solid Sol. IV
Solid Sol. III and IV
Composition of liquid phase
Composition of solid phases.
Solid Sol. III
Solid Sol. II and III
Solid Sol. I and II
Solid Sol. II
Moles of $CuSO_4$ per 100 of $CuSO_4$ and $ZnSO_4$

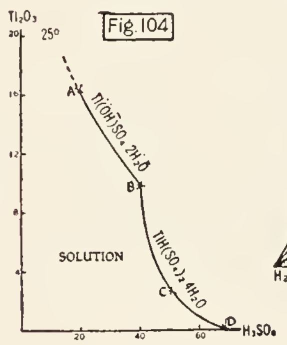


Fig. 104
Tl_2O_3
25°
$Tl(OH)SO_4 \cdot 2H_2O$
$TlH(SO_4)_2 \cdot 4H_2O$
SOLUTION
H_2SO_4

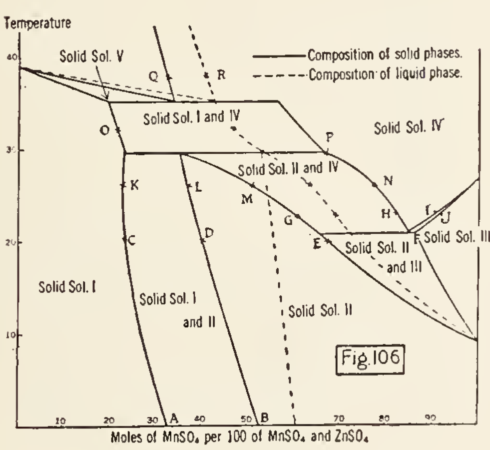


Fig. 106
Temperature
Solid Sol. V
Composition of solid phases.
Composition of liquid phase.
Solid Sol. I and IV
Solid Sol. IV
Solid Sol. II and IV
Solid Sol. II and III
Solid Sol. III
Solid Sol. I
Solid Sol. I and II
Solid Sol. II
Moles of $MnSO_4$ per 100 of $MnSO_4$ and $ZnSO_4$

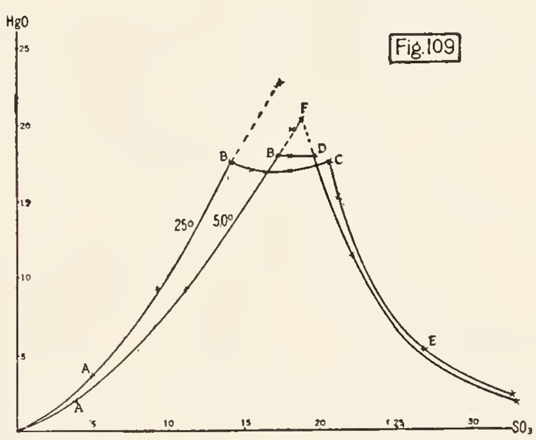


Fig. 109
HgO
25°
50°
SO_3

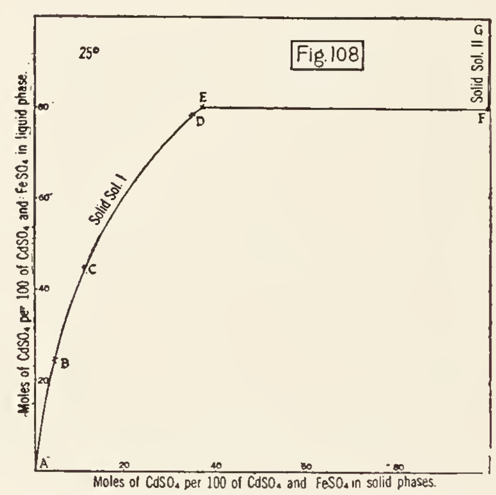


Fig. 108
25°
Solid Sol. I
Solid Sol. II
Moles of $CdSO_4$ per 100 of $CdSO_4$ and $FeSO_4$ in liquid phase.
Moles of $CdSO_4$ per 100 of $CdSO_4$ and $FeSO_4$ in solid phases.

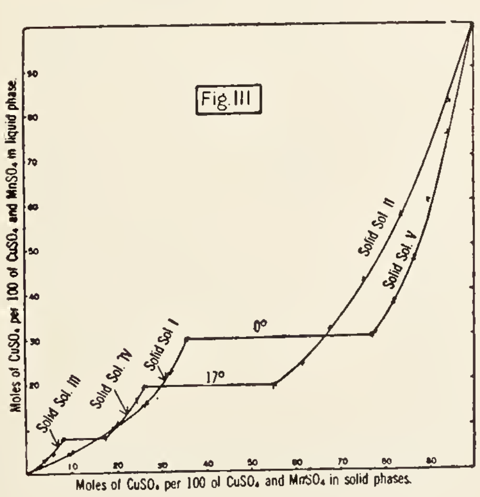


Fig. 111
Moles of $CuSO_4$ per 100 of $CuSO_4$ and $MnSO_4$ in liquid phase.
Solid Sol. III
Solid Sol. IV
Solid Sol. I
Solid Sol. II
Solid Sol. V
0°
17°
Moles of $CuSO_4$ per 100 of $CuSO_4$ and $MnSO_4$ in solid phases.

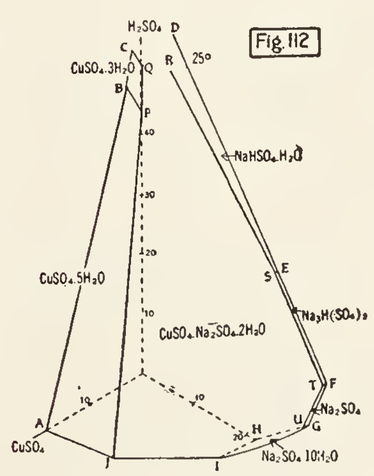


Fig. 112
H_2SO_4
25°
$CuSO_4 \cdot 3H_2O$
$NaHSO_4 \cdot H_2O$
$CuSO_4 \cdot 5H_2O$
$CuSO_4 \cdot Na_2SO_4 \cdot 2H_2O$
$Na_3H(SO_4)_2$
Na_2SO_4
$CuSO_4$
$Na_2SO_4 \cdot 10H_2O$

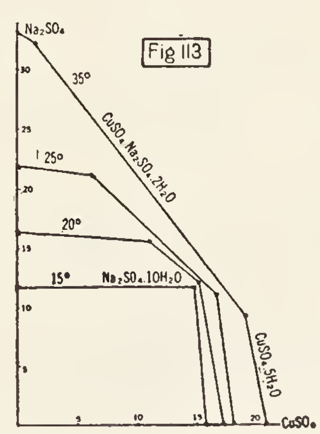


Fig. 113
Na_2SO_4
35°
25°
20°
15°
$CuSO_4 \cdot Na_2SO_4 \cdot 2H_2O$
$Na_2SO_4 \cdot 10H_2O$
$CuSO_4 \cdot 5H_2O$
$CuSO_4$

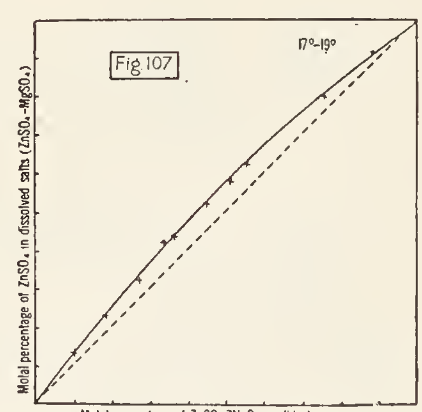


Fig. 107
17°–19°
Molal percentage of $ZnSO_4$ in dissolved salts ($ZnSO_4$–$MgSO_4$)
Molal percentage of $ZnSO_4 \cdot 7H_2O$ in solid phase.

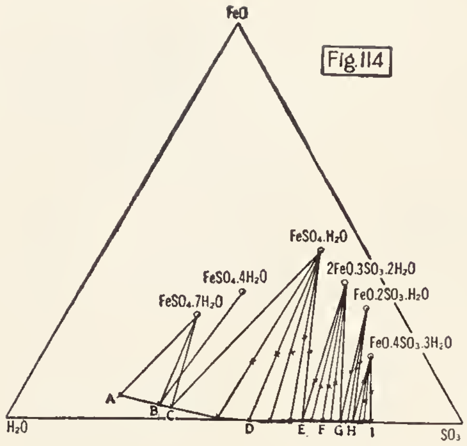
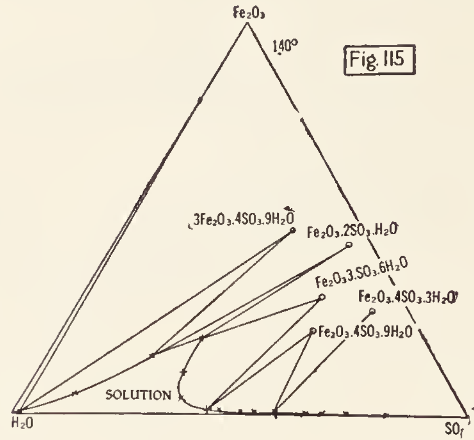
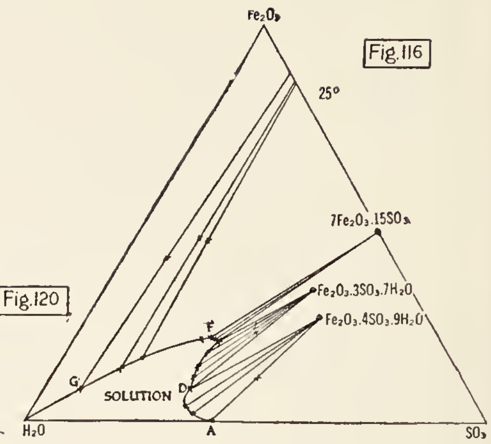


Fig. 114
FeO
FeSO₄.H₂O
FeSO₄.4H₂O
FeSO₄.7H₂O
2FeO.3SO₃.2H₂O
FeO.2SO₃.H₂O
FeO.4SO₃.3H₂O
H₂O
SO₃
A
B
C
D
E
F
G
H
I


Fe₂O₃
140°
Fig. 115
3Fe₂O₃.4SO₃.9H₂O
Fe₂O₃.2SO₃.H₂O
Fe₂O₃.3SO₃.6H₂O
Fe₂O₃.4SO₃.3H₂O
Fe₂O₃.4SO₃.9H₂O
SOLUTION
H₂O
SO₃


Fe₂O₃
Fig. 116
25°
7Fe₂O₃.15SO₃
Fe₂O₃.3SO₃.7H₂O
Fe₂O₃.4SO₃.9H₂O
SOLUTION
H₂O
A
SO₃

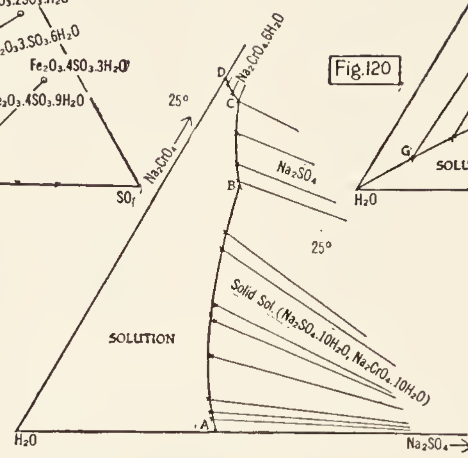


Fig. 120
Na₂CrO₄.6H₂O
25°
Na₂CrO₄
Na₂SO₄
25°
Solid Sol. (Na₂SO₄.10H₂O, Na₂CrO₄.10H₂O)
SOLUTION
H₂O
Na₂SO₄
A
B
C
D

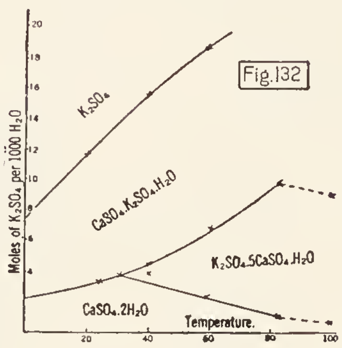
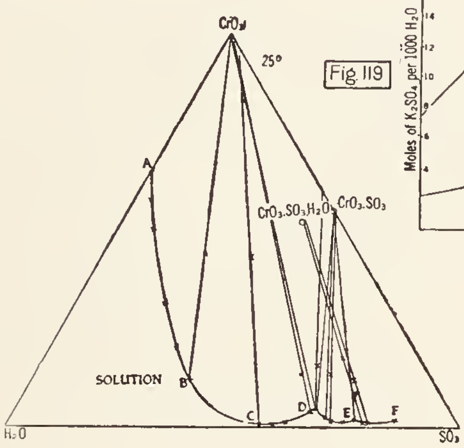
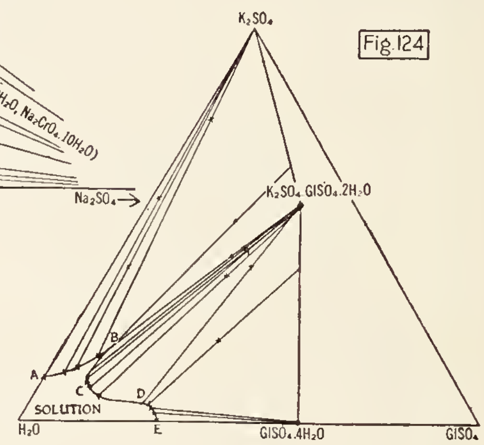


Fig. 132
Moles of K₂SO₄ per 1000 H₂O
K₂SO₄
CaSO₄.K₂SO₄.H₂O
K₂SO₄.5CaSO₄.H₂O
CaSO₄.2H₂O
Temperature.
20
40
60
80
100


CrO₃
25°
Fig. 119
A
CrO₃.SO₃.H₂O
CrO₃.SO₃
SOLUTION
B
C
D
E
F
H₂O
SO₃


K₂SO₄
Fig. 124
K₂SO₄.GlSO₄.2H₂O
A
B
C
D
E
SOLUTION
H₂O
GlSO₄.4H₂O
GlSO₄

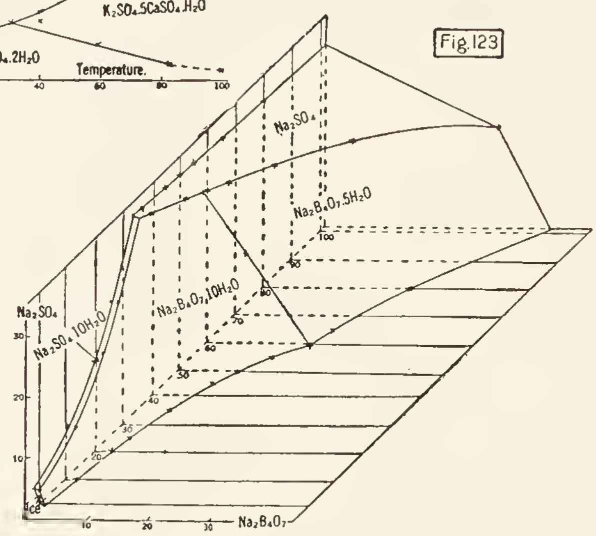


Fig. 123
Na₂SO₄
Na₂B₄O₇.5H₂O
Na₂B₄O₇.10H₂O
Na₂SO₄.10H₂O
Na₂SO₄
Ice
Na₂B₄O₇

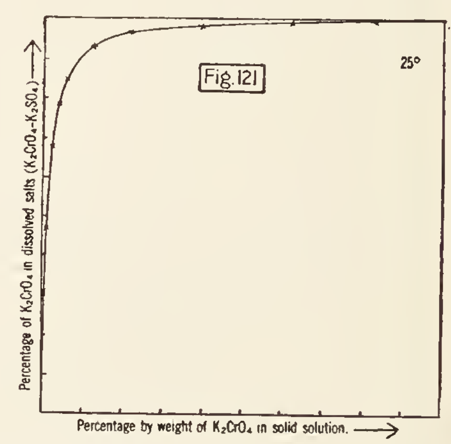
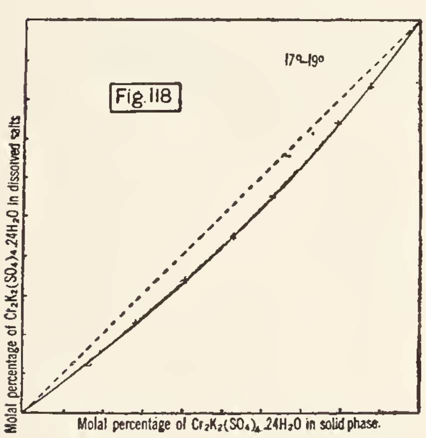


Fig. 121
25°
Percentage of K₂CrO₄ in dissolved salts (K₂CrO₄-K₂SO₄)
Percentage by weight of K₂CrO₄ in solid solution.


17°-19°
Fig. 118
Molal percentage of Cr₂K₂(SO₄)₄.24H₂O in dissolved salts
Molal percentage of Cr₂K₂(SO₄)₄.24H₂O in solid phase.

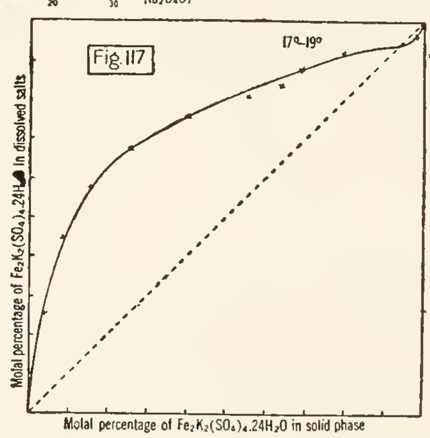


Fig. 117
17°-19°
Molal percentage of Fe₂K₂(SO₄)₄.24H₂O in dissolved salts
Molal percentage of Fe₂K₂(SO₄)₄.24H₂O in solid phase

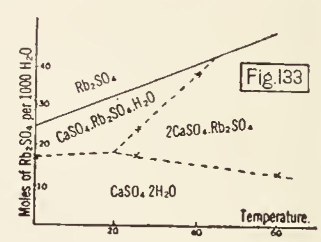


Fig. 133
Moles of Rb₂SO₄ per 1000 H₂O
Rb₂SO₄
CaSO₄.Rb₂SO₄.H₂O
2CaSO₄.Rb₂SO₄
CaSO₄.2H₂O
Temperature.

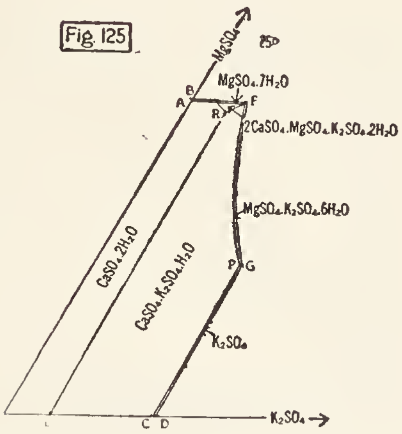
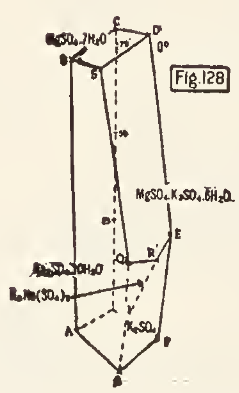


Fig. 125
MgSO₄
25°
MgSO₄.7H₂O
2CaSO₄.MgSO₄.K₂SO₄.2H₂O
MgSO₄.K₂SO₄.6H₂O
CaSO₄.2H₂O
CaSO₄.K₂SO₄.H₂O
K₂SO₄
C
D
K₂SO₄


MgSO₄.7H₂O
0°
Fig. 128
MgSO₄.K₂SO₄.6H₂O
K₂SO₄

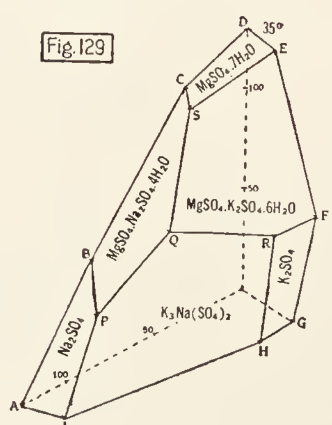


Fig. 129
35°
MgSO₄.7H₂O
MgSO₄.Na₂SO₄.4H₂O
MgSO₄.K₂SO₄.6H₂O
K₂SO₄
K₃Na(SO₄)₂
Na₂SO₄

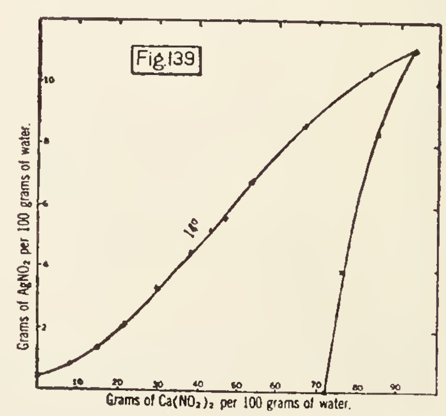


Fig. 139
14°
Grams of AgNO₃ per 100 grams of water.
Grams of Ca(NO₃)₂ per 100 grams of water.

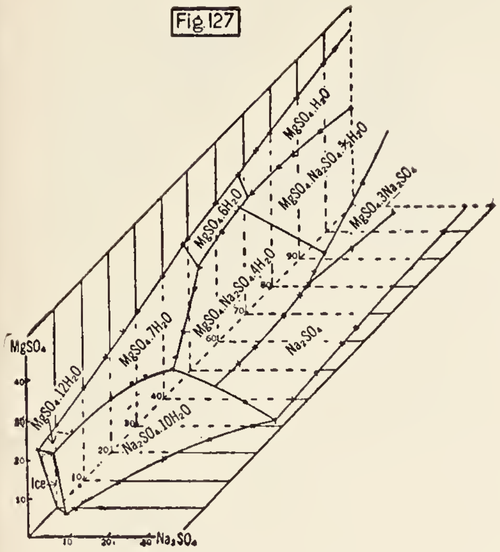


Fig.127
$MgSO_4$
$MgSO_4.H_2O$
$MgSO_4.6H_2O$
$MgSO_4.7H_2O$
$MgSO_4.12H_2O$
$MgSO_4.Na_2SO_4.4H_2O$
$Na_2SO_4.10H_2O$
Na_2SO_4
$MgSO_4.3Na_2SO_4$
Ice
Na_2SO_4

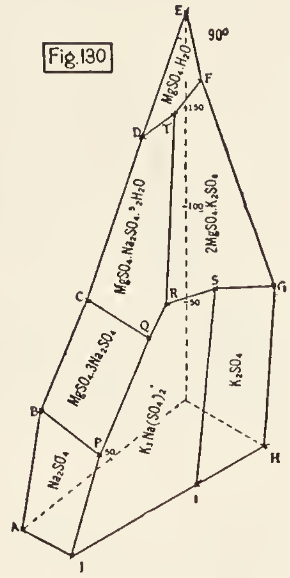


Fig.130
90°
$MgSO_4.H_2O$
$MgSO_4.Na_2SO_4.2\frac{1}{2}H_2O$
$2MgSO_4.K_2SO_4$
$MgSO_4.3Na_2SO_4$
$K_3Na(SO_4)_2$
K_2SO_4
Na_2SO_4

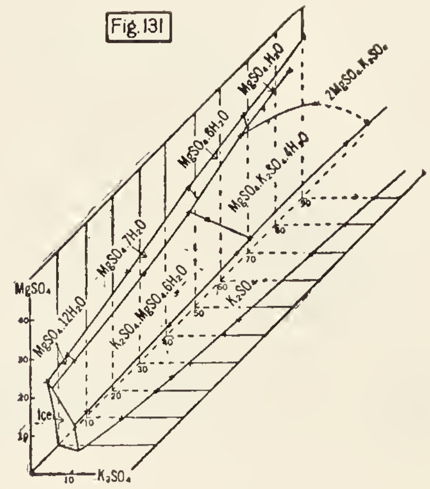


Fig.131
$MgSO_4$
$MgSO_4.H_2O$
$MgSO_4.6H_2O$
$MgSO_4.7H_2O$
$MgSO_4.12H_2O$
$2MgSO_4.K_2SO_4$
$MgSO_4.K_2SO_4.4H_2O$
$K_2SO_4.MgSO_4.6H_2O$
K_2SO_4
Ice

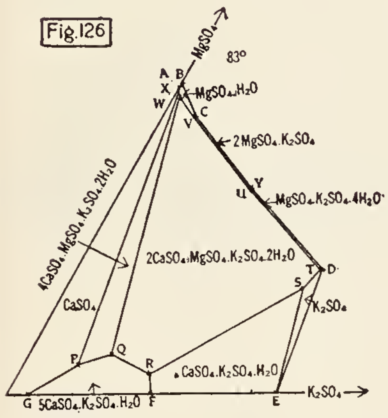
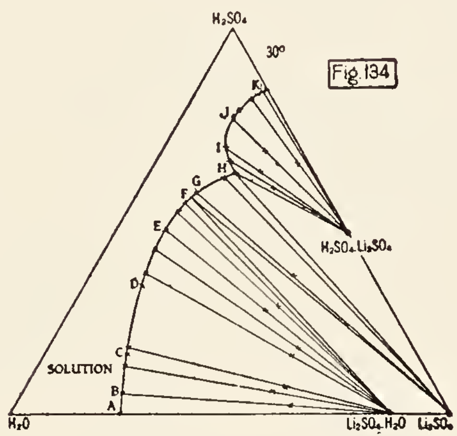


Fig.126
$MgSO_4$
83°
$MgSO_4.H_2O$
$2MgSO_4.K_2SO_4$
$MgSO_4.K_2SO_4.4H_2O$
$4CaSO_4.MgSO_4.K_2SO_4.2H_2O$
$2CaSO_4.MgSO_4.K_2SO_4.2H_2O$
$CaSO_4$
K_2SO_4
$CaSO_4.K_2SO_4.H_2O$
$5CaSO_4.K_2SO_4.H_2O$
K_2SO_4


H_2SO_4
30°
Fig.134
$H_2SO_4.Li_2SO_4$
SOLUTION
H_2O
$Li_2SO_4.H_2O$
Li_2SO_4

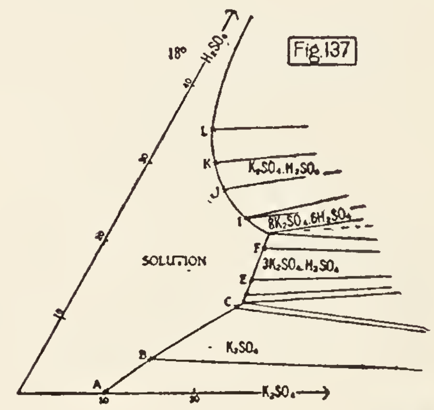
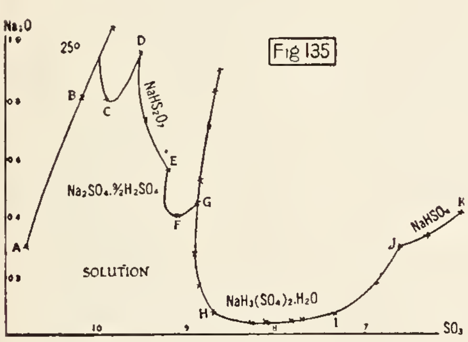
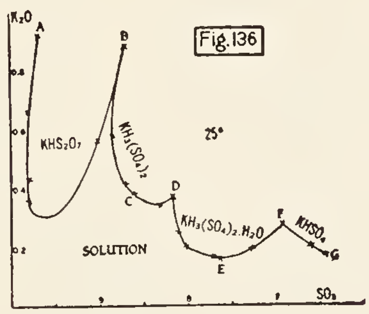


Fig.137
18°
H_2SO_4
$K_2SO_4.H_2SO_4$
$8K_2SO_4.6H_2SO_4$
SOLUTION
$3K_2SO_4.H_2SO_4$
K_2SO_4
K_2SO_4


Na_2O
25°
Fig 135
$NaHS_2O_7$
$Na_2SO_4.\frac{3}{2}H_2SO_4$
$NaHSO_4$
SOLUTION
$NaH_3(SO_4)_2.H_2O$
SO_3


K_2O
Fig.136
KHS_2O_7
$KH_3(SO_4)_2$
25°
SOLUTION
$KH_3(SO_4)_2.H_2O$
$KHSO_4$
SO_3

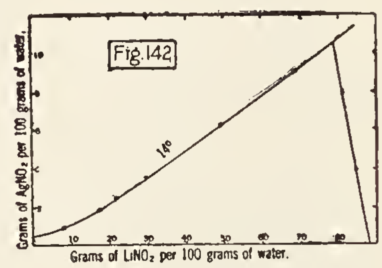
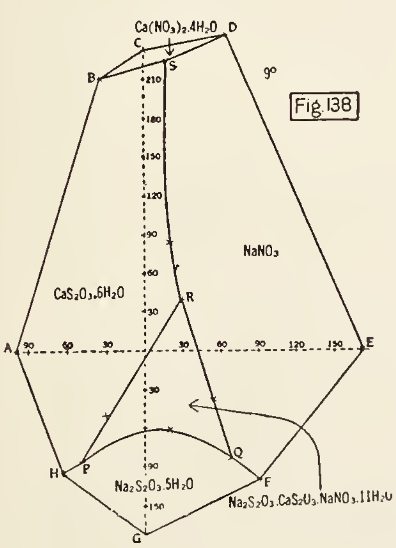


Fig.142
14°
Grams of $AgNO_2$ per 100 grams of water.
Grams of $LiNO_2$ per 100 grams of water.


$Ca(NO_3)_2.4H_2O$
9°
Fig.138
$NaNO_3$
$CaS_2O_3.6H_2O$
$Na_2S_2O_3.5H_2O$
$Na_2S_2O_3.CaS_2O_3.NaNO_3.11H_2O$

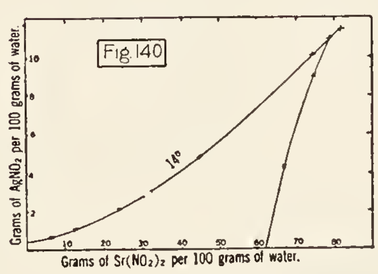


Fig.140
14°
Grams of $AgNO_2$ per 100 grams of water.
Grams of $Sr(NO_2)_2$ per 100 grams of water.

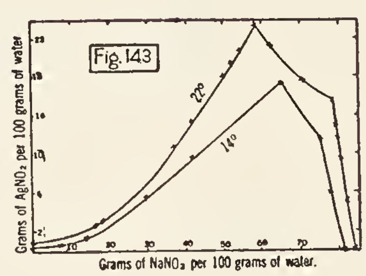


Fig.143
22°
14°
Grams of $AgNO_2$ per 100 grams of water
Grams of $NaNO_3$ per 100 grams of water.

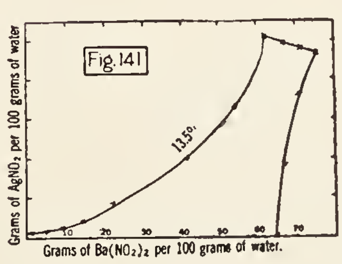
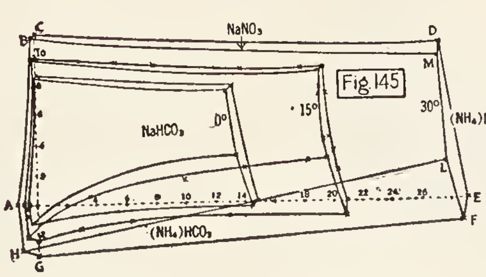


Fig.141
13.5°
Grams of $AgNO_2$ per 100 grams of water
Grams of $Ba(NO_2)_2$ per 100 grams of water.


$NaNO_3$
Fig.145
$NaHCO_3$
0°
15°
30°
$(NH_4)NO_3$
$(NH_4)HCO_3$


$(NH_4)NO_3$
Solid Sol. I
Solid Sol. II
17°
Solid Sol. III
Fig.146
KNO_3

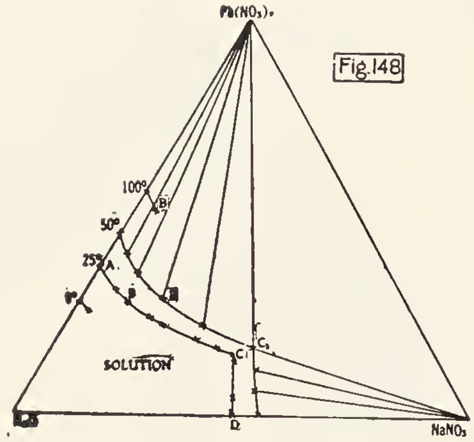


Fig. 148
Pb(NO₃)₂
100°
50°
25°
SOLUTION
NaNO₃

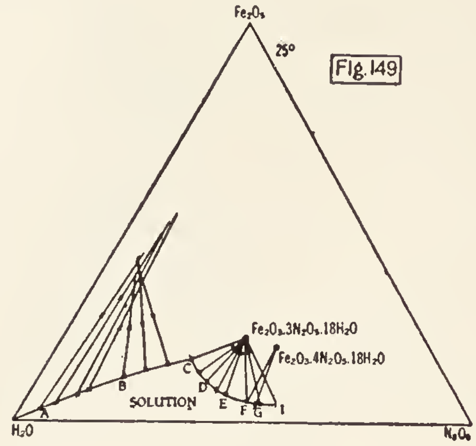


Fig. 149
Fe₂O₃
25°
Fe₂O₃.3N₂O₅.18H₂O
Fe₂O₃.4N₂O₅.18H₂O
SOLUTION
H₂O

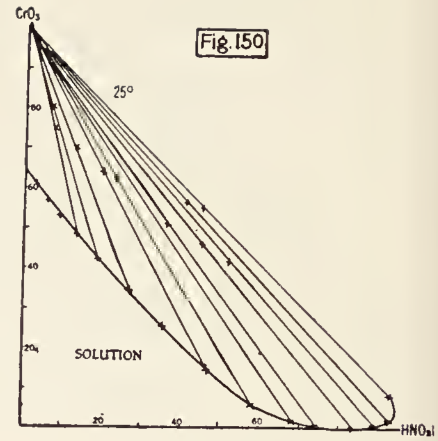


Fig. 150
CrO₃
25°
SOLUTION
HNO₃

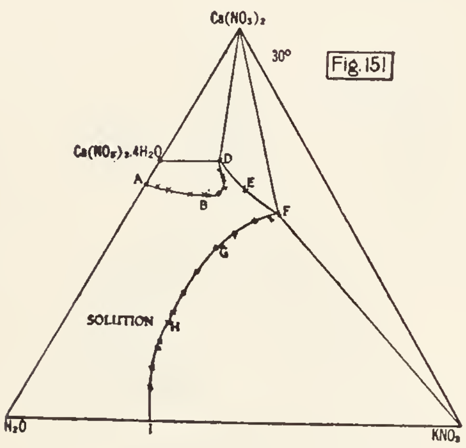


Fig. 151
Ca(NO₃)₂
30°
SOLUTION
H₂O
KNO₃

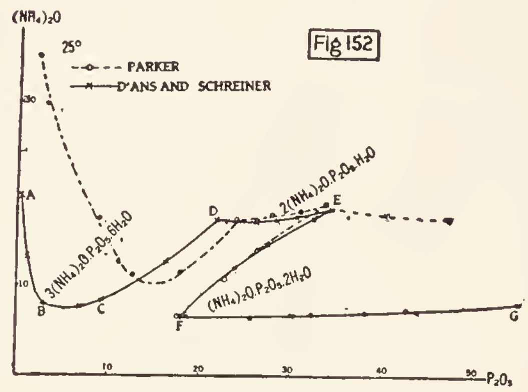


Fig 152
(NH₄)₂O
25°
PARKER
D'ANS AND SCHREINER
3(NH₄)₂O.P₂O₅.6H₂O
2(NH₄)₂O.P₂O₅.H₂O
(NH₄)₂O.P₂O₅.2H₂O
P₂O₅

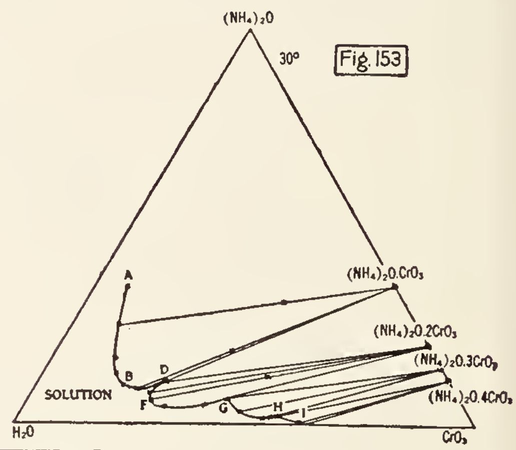


Fig. 153
(NH₄)₂O
30°
(NH₄)₂O.CrO₃
(NH₄)₂O.2CrO₃
(NH₄)₂O.3CrO₃
(NH₄)₂O.4CrO₃
SOLUTION
H₂O
CrO₃

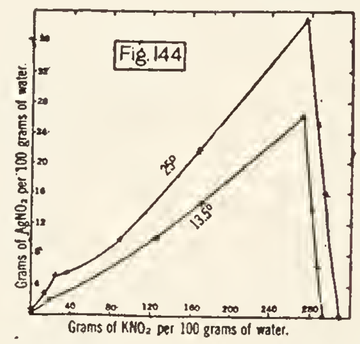


Fig. 144
25°
13.5°
Grams of AgNO₃ per 100 grams of water.
Grams of KNO₃ per 100 grams of water.

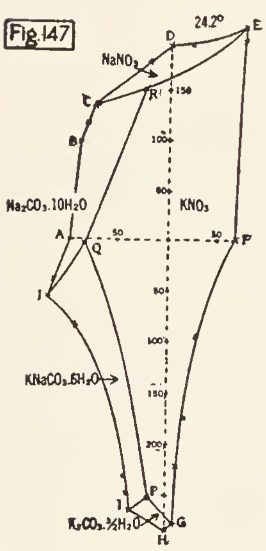


Fig. 147
24.2°
NaNO₃
KNO₃
Na₂CO₃.10H₂O
KNaCO₃.6H₂O
K₂CO₃.½H₂O

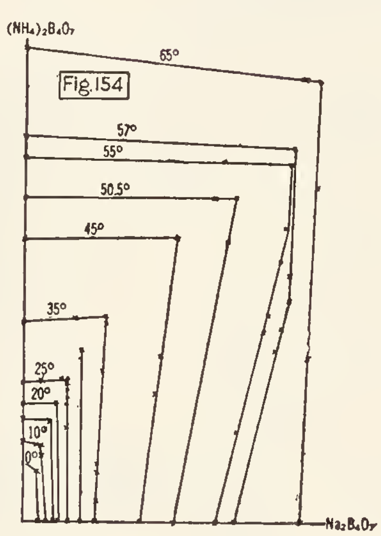


Fig. 154
(NH₄)₂B₄O₇
65°
57°
55°
50.5°
45°
35°
25°
20°
10°
Na₂B₄O₇

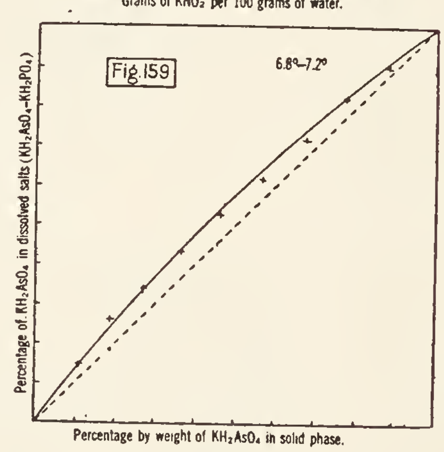


Fig. 159
6.8°–7.2°
Percentage of KH₂AsO₄ in dissolved salts (KH₂AsO₄–KH₂PO₄)
Percentage by weight of KH₂AsO₄ in solid phase.

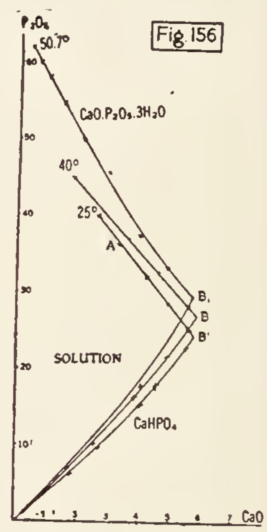


Fig. 156
P₂O₅
50.7°
CaO.P₂O₅.3H₂O
40°
25°
SOLUTION
CaHPO₄
CaO

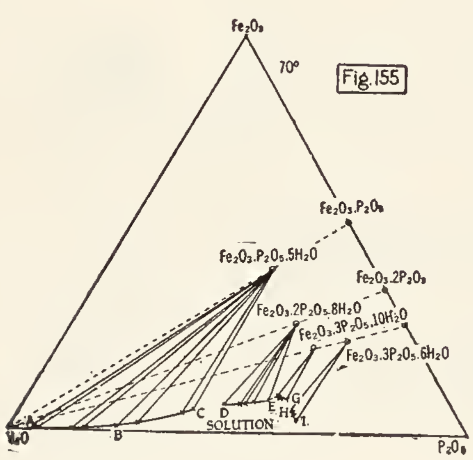


Fig. 155
Fe₂O₃
70°
Fe₂O₃.P₂O₅
Fe₂O₃.P₂O₅.5H₂O
Fe₂O₃.2P₂O₅
Fe₂O₃.2P₂O₅.8H₂O
Fe₂O₃.3P₂O₅.10H₂O
Fe₂O₃.3P₂O₅.6H₂O
SOLUTION
H₂O
P₂O₅

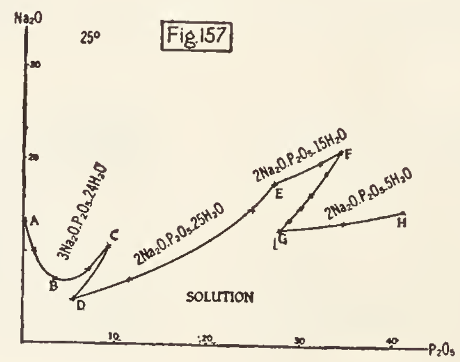


Fig. 157
Na₂O
25°
3Na₂O.P₂O₅.24H₂O
2Na₂O.P₂O₅.25H₂O
2Na₂O.P₂O₅.15H₂O
2Na₂O.P₂O₅.5H₂O
SOLUTION
P₂O₅

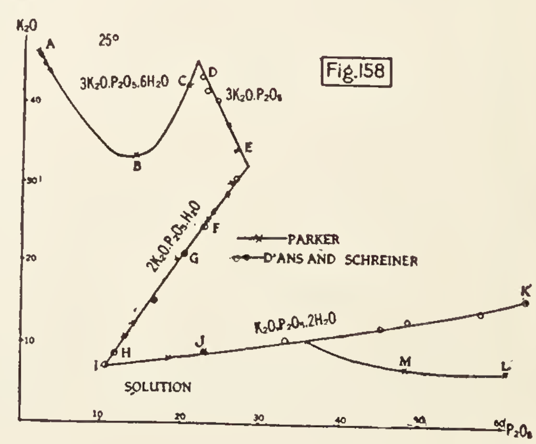


Fig. 158
K₂O
25°
3K₂O.P₂O₅.6H₂O
3K₂O.P₂O₅
2K₂O.P₂O₅.H₂O
PARKER
D'ANS AND SCHREINER
K₂O.P₂O₅.2H₂O
SOLUTION
P₂O₅

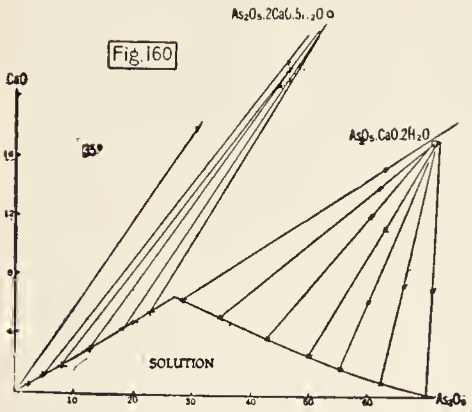


Fig. 160

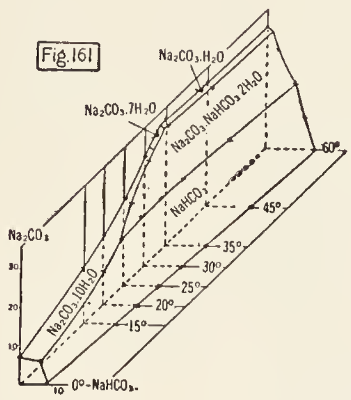


Fig. 161

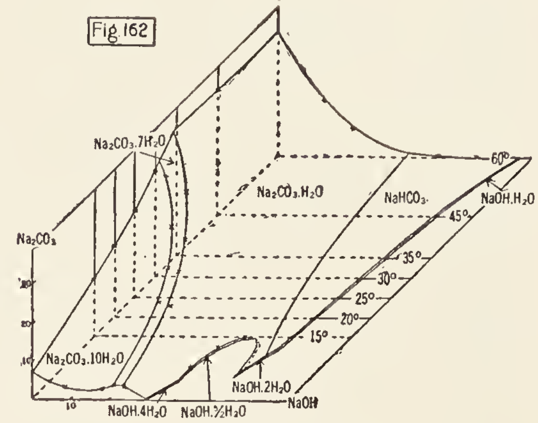


Fig. 162

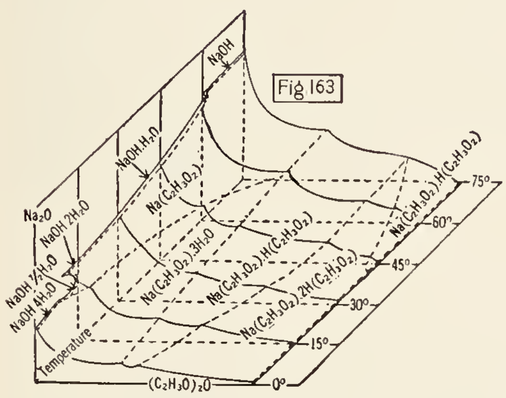


Fig. 163

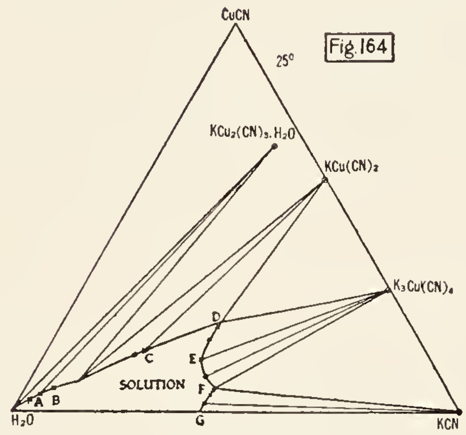


Fig. 164

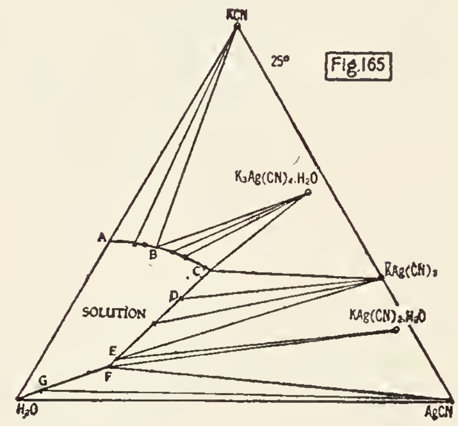


Fig. 165

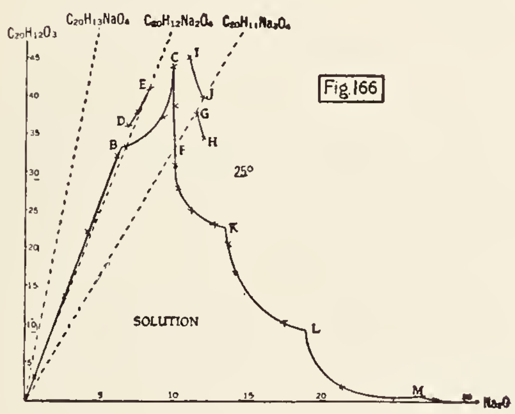


Fig. 166

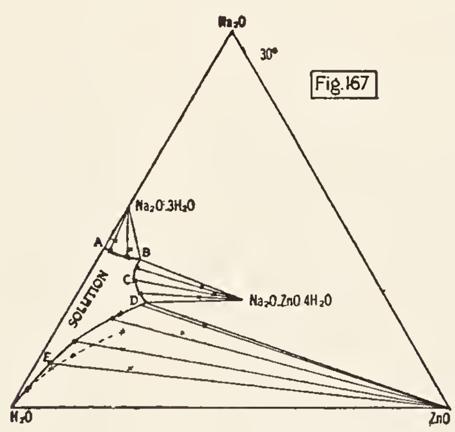


Fig. 167

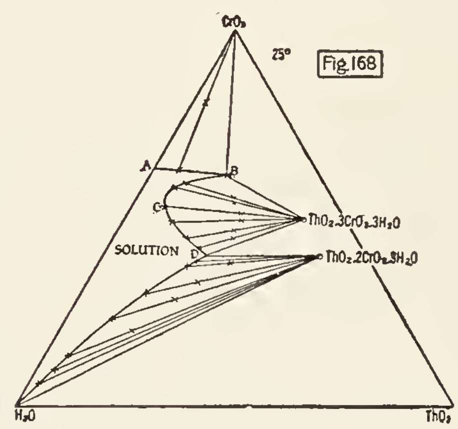


Fig. 168

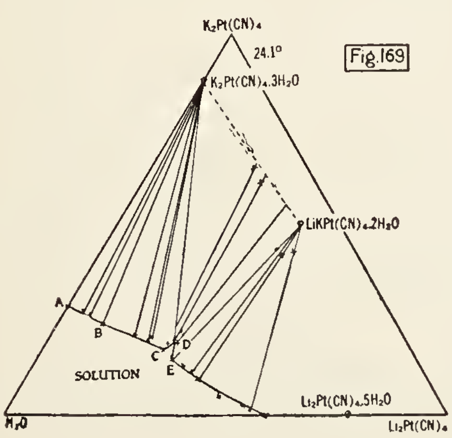


Fig. 169

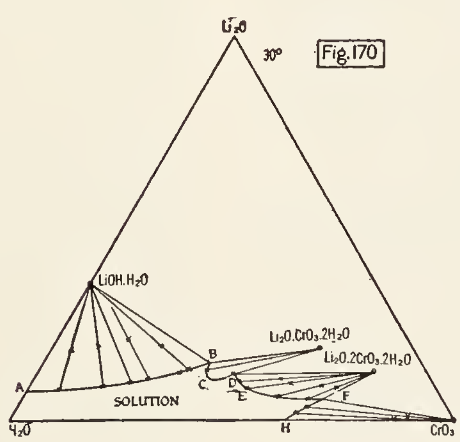


Fig. 170

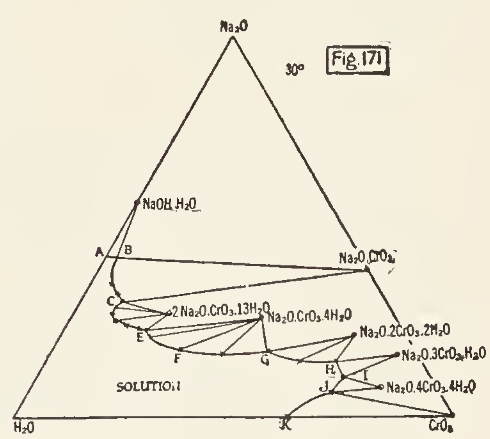


Fig. 171

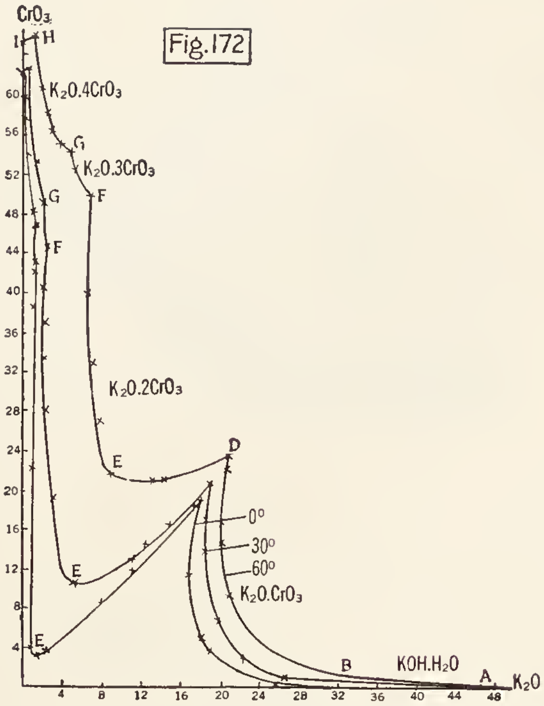


Fig. 172

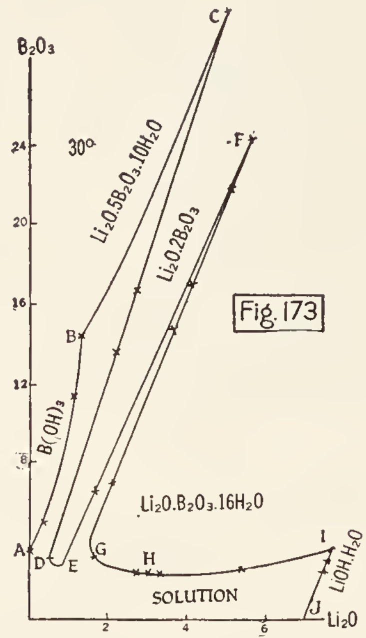


Fig. 173

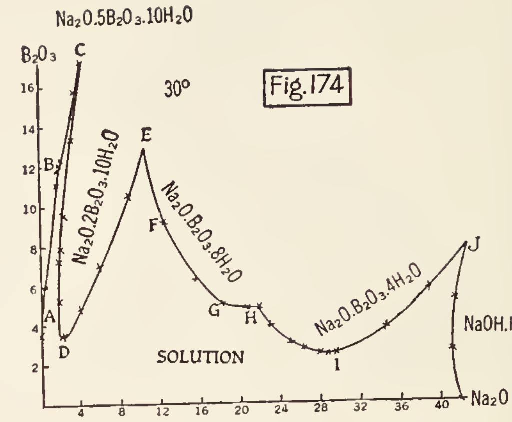


Fig. 174

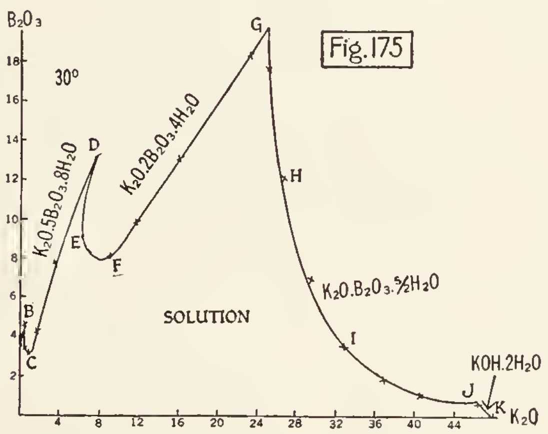


Fig. 175

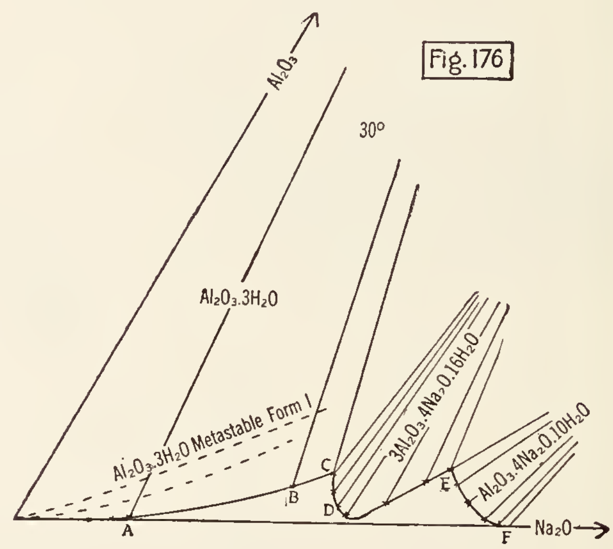


Fig. 176

(210) Hoitsema, *7*, **17**: 651; 95. (211) Hoitsema, *7*, **27**: 312; 98. (212) Hollmann, *7*, **37**: 193; 01. (213) Hollmann, *7*, **54**: 98; 05. (214) Iljinski, *Ann. l'inst. d'analyse phys. chim., Leningrad*, **2**: 50, 54; 23. (215) Inamura, *429*, **4**: 105; 19. (215.5) Ishikawa, *41B*, **1**: 139; 26. (216) Iwaki, *429*, **1**: 81; 14. (217) Jackman and Browne, *4*, **121**: 694; 22. (218) Jackson, *1*, **36**: 2346; 14. (219) Jänecke, *93*, **71**: 1; 11.

(220) Jänecke, *93*, **100**: 176; 17. **102**: 41; 18. **103**: 1; 18. (221) James and Holden, *1*, **35**: 559; 13. (222) James and Whittemore, *1*, **34**: 1168; 12. (223) James, Whittemore and Holden, *1*, **36**: 1853; 14. (224) Jehu and Hudleston, *4*, **125**: 1451; 24. (225) Joseph, *4*, **117**: 377; 20. (226) Kasarnowsky, *7*, **109**: 287; 24. (227) Kazaneckii, *53*, **46**: 1110; 14. (228) Kendricks, *50*, **12**: 693; 08. (229) Keyes and James, *1*, **36**: 634; 14.

(230) Klein, *93*, **74**: 157; 11. (231) van Klooster, *50*, **21**: 513; 17. (232) Koppel, *7*, **42**: 1; 02. (233) Koppel, *7*, **52**: 385; 05. (234) Koppel and Blumenthal, *93*, **53**: 228; 07. (235) Koppel and Holtkamp, *93*, **67**: 266; 10. (236) Kremann and Noss, *57*, **33**: 1205; 12. (237) Kremann and Rodemund, *93*, **86**: 373; 14. (238) Kremann and Zitek, *75*, **118 IIb**: 59; 09. (239) Küster and Thiel, *93*, **21**: 116; 99.

(240) Kurnakov and Zhemchuzhnui, *53*, **51**: 1; 19. (241) Kurnakov and Zhemchuzhnui, *93*, **140**: 149; 24. (242) Lamb and Phillips, *1*, **45**: 108; 23. (243) Le Chatelier, *34*, **100**: 737; 85. (244) Lee and Egerton, *4*, **123**: 706; 23. (245) van Leeuwen, *7*, **23**: 33; 97. (246) Lind, Underwood and Whittemore, *1*, **40**: 465; 18. (247) Lipscomb and Hulett, *50*, **20**: 75; 16. (248) Löwenherz, *7*, **13**: 491; 94. (249) Lowry, *5*, **91**: 53; 15.

(250) Lunge, *54*, **4**: 31; 85. (251) McCoy and Test, *1*, **33**: 473; 11. (252) Maeda and Yamane, *210*, **4**: 85; 26. (253) Malquori, *36*, **56**: 37; 26. (254) Marden, *1*, **38**: 310; 16. (255) Massink, *7*, **92**: 351; 17. (256) Masson, *4*, **99**: 1132; 11. (257) Mayeda, *41*, **23**: 573; 20. (258) Meerburg, *93*, **37**: 199; 03. (259) Meerburg, *93*, **45**: 1; 05.

(260) Meerburg, *93*, **45**: 324; 05. (261) Meerburg, *93*, **59**: 136; 08. (262) Meijer, *70*, **43**: 397; 24. (263) Meyer, *70*, **42**: 301; 23. (264) Meyer and Stateczny, *93*, **122**: 1; 22. (265) Meyer, Wassjuchnow, Drapier and Bodländer, *93*, **86**: 258; 14. (266) Meyer and Wilk, *93*, **132**: 239; 24. (267) Meyerhoffer, *7*, **3**: 336; 89. **5**: 97; 90. (268) Meyerhoffer, *7*, **53**: 513; 05. (269) Meyerhoffer and Saunders, *7*, **28**: 453; 99.

(270) Milikan, *7*, **92**: 59; 18. (271) Milikan, *7*, **92**: 499; 18. (272) Milligan, *1*, **44**: 567; 22. (273) Mondain-Monval, *34*, **174**: 1014; 22. **175**: 162; 22. (274) Moser, *93*, **61**: 379; 09. (275) Müller, *7*, **110**: 365; 24. (276) Mumford and Gilbert, *4*, **123**: 471; 23. (277) Muthmann and Kuntze, *94*, **23**: 368; 94. (278) Nichols and Howes, *152*, No. **298**: 212; 19. (279) Nishizawa, *142*, **23**: 25; 20.

(280) Noyes, Boggs, Farrell and Stewart, *1*, **33**: 1650; 11. (281) Noyes and Bray, *1*, **33**: 1643; 11. (282) Noyes and Chow, *1*, **40**: 739; 18. (283) Noyes and Clement, *7*, **13**: 412; 94. (284) Noyes, Hall and Beattie, *1*, **39**: 2526; 17. (285) Noyes and Seidensticker, *11*, **21**: 217; 99. (286) Okazawa, *41*, **41**: 602; 20. (287) Osaka, *479*, **1**: 93; 08. (288) Osaka, *479*, **3**: 58; 11. (289) Osaka, *70*, **42**: 594; 23.

(290) Osaka and Ando, *7*, **110**: 786; 24. (291) Osaka, Shima and Yoshida, *429*, **7**: 69; 24. (292) Osaka and Yoshida, *429*, **6**: 49; 22. (293) Ostwald, *14*, **1**: 32; 14. (294) Parker, *50*, **18**: 653; 14. (295) Parsons and Corson, *1*, **32**: 1383; 10. (296) Parsons and Perkins, *1*, **32**: 1387; 10. (297) Pelling and Robertson, *South African Journal of Science*, **20**: 236; 23. (298) Pellini, *36*, **40 II**: 37; 10. (299) Poma, *36*, **40 I**: 193; 10.

(300) Posnjak and Merwin, *1*, **44**: 1965; 22. (301) Prandtl and Ducrue, *93*, **150**: 105; 26. (302) Pratt and James, *1*, **33**: 488; 11. (303) Precht and Wittjen, *25*, **14**: 1667; 81. (304) Raffo and Rossi, *36*, **45 I**: 45; 15. (305) Rakovskij and Dobrzinskij, *Ann. inst. réac. chim. pures., Leningrad*, **1**: 203; 23. (306) Recoura, *6*, **12**: 263; 07. (307) Reinders, *93*, **93**: 202; 15. (308) Richards and Kelley, *1*, **33**: 847; 11. (309) Richards and Wrede, *65*, **43**: 343; 07.

(310) Riesenfeld and Feld, *93*, **116**: 213; 21. (311) Rivett, *4*, **121**: 379; 22. (312) Rivett and Clendinnen, *4*, **123**: 1634; 23. (313) Rivett and Lewis, *70*, **42**: 954; 23. (314) Rivett and O'Connor, *4*, **115**: 1346; 19. (315) Robinson and Waggaman, *50*, **13**: 673; 09. (316) Rosenheim and Grünbaum, *93*, **61**: 187; 09. (317) Rosenheim and Pritze, *93*, **63**: 275; 09. (318) Ruff and Schiller, *93*, **72**: 329; 11. (319) Sackur and Taegener, *9*, **18**: 718; 12.

(320) Sahmen, *7*, **54**: 111; 05. (321) Sakabe, *429*, **1**: 57; 14. (322) Saxton, *45*, **14**: 281; 22. (323) Sborgi, *22*, **22 I**: 90; 13. (324) Sborgi, *22*, **22 I**: 715; 13. (325) Sborgi, *36*, **54**: 946; 24. (326) Sborgi and Bovalini, *36*, **54**: 919; 24. (327) Sborgi, Bovalini and Cappellini, *36*, **54**: 298; 24. (328) Sborgi,

Bovalini and Medici, *36*, **54**: 934; 24. (329) Sborgi and Franco, *36*, **51 II**: 1; 21.
(330) Sborgi and Gallichi, *36*, **54**: 255; 24. (331) Sborgi and Gallichi, *36*, **54**: 283; 24. (332) Sborgi and Stefanini, *36*, **54**: 322; 24. (333) Schaper, *7*, **72**: 308; 10. (334) Schreinemakers, *7*, **9**: 55; 92. **10**: 476; 92. (335) Schreinemakers, *7*, **12**: 73; 93. (336) Schreinemakers, *7*, **55**: 71; 06. (337) Schreinemakers, *7*, **59**: 641; 07. (338) Schreinemakers, *7*, **66**: 687; 09. (339) Schreinemakers, *7*, **68**: 83; 09.
(340) Schreinemakers, *7*, **69**: 557; 09. (341) Schreinemakers, *176*, **7**: 197; 10. (341.5) Schreinemakers, *176*, **7**: 333; 10. (342) Schreinemakers, *18*, **15**: 80; 10. (343) Schreinemakers, *7*, **71**: 109; 10. (344) Schreinemakers, *18*, **15**: 396; 11. (345) Schreinemakers, *64P*, **13**: 1163; 11. (346) Schreinemakers, *64P*, **15**: 1313; 13. (347) Schreinemakers and de Baat, *7*, **65**: 586; 09. (348) Schreinemakers and de Baat, *176*, **7**: 259, 10. (349) Schreinemakers and de Baat, *64P*, **17**: 533; 14.
(350) Schreinemakers and de Baat, *64P*, **17**: 781; 14. (351) Schreinemakers and de Baat, *64P*, **17**: 2, 1111; 15. (352) Schreinemakers and de Baat, *64P*, **18**: 126; 15. (353) Schreinemakers and de Baat, *176*, **14**: 141; 17. (354) Schreinemakers and de Baat, *176*, **14**: 262; 17. (355) Schreinemakers and de Baat, *70*, **39**: 423; 20. (356) Schreinemakers, Berkhoff and Posthumus, *70*, **43**: 508; 24. (357) Schreinemakers and Kayser, *176*, **15**: 120; 18. (358) Schreinemakers and Noorduyn, *176*, **15**: 118; 18. (359) Schreinemakers and Thonus, *64P*, **15**: 472; 12.
(360) Schurmann, *1*, **46**: 1444; 24. (361) Seidell and Smith, *50*, **8**: 493; 04. (361.5) Sidgwick and Lewis, *4*, **1926**: 1287. (362) Smith, *1*, **42**: 259; 20. (363) Smith, *1*, **45**: 360; 23. (364) Smits, Elgersma and Hardenberg, *70*, **43**: 671; 24. (365) Spencer, *4*, **107**: 1265; 15. (366) Stortenbeker, *7*, **16**: 250; 95. (367) Stortenbeker, *7*, **22**: 60; 97. (368) Stortenbeker, *7*, **34**: 108; 00. (369) Stortenbeker, *70*, **21**: 399; 02.
(370) Straub, *7*, **77**: 331; 11. (371) Sudhaus, *190B*, **37**: 1; 14. (372) Süss, *94*, **51**: 240; 12. (373) Sullivan, *1*, **27**: 529; 05. (374) Taber, *50*, **10**: 626; 06 (375) Takegami, *429*, **4**: 317; 21. (376) Takegami, *429*, **5**: 194; 22. (377) Takeuchi, *429*, **1**: 249; 16. (378) Terres and Weiser, *9*, **27**: 177; 21. (379) Terrey and Jolly, *4*, **123**: 2217; 23.
(380) Thin and Cummings, *4*, **107**: 361; 15. (381) Tilden and Shenstone, *5*, **38**: 331; 85. (382) Toda, *429*, **4**: 305; 21. (383) Toda, *429*, **4**: 377; 21. (384) Toperescu, *34*, **174**: 870; 22. **175**: 268; 22. (385) Trifanov, *Ann. scient. univ. Saratov*, **1**: 10; 23. (386) Trimble, *1*, **44**: 451; 22. (387) Uyeda, *172*, **8 XXII**: 235; 12. (388) Valeton and Frömel, *93*, **137**: 91; 24. (389) Van Name and Bothworth, *93*, **67**: 97; 10.
(390) de Waal, *Diss.*, Leiden, 1910. (391) Wales, *45*, **14**: 317; 22. (392) Walker and Fyffe, *4*, **83**: 173; 03. (393) Weston, *4*, **121**: 1223; 22. (394) Wirth, *93*, **58**: 213; 08. (395) Wirth, *93*, **76**: 174; 12. (396) Wirth, *93*, **79**: 360; 12. (397) Wirth, *93*, **87**: 1; 14. (398) Wirth, *93*, **87**: 9; 14. (399) Wirth and Bakke, *93*, **87**: 13; 14.
(400) Wirth and Bakke, *93*, **87**: 47; 14. (400.5) Wöhler and Schäfter, *93*, **149**: 389; 25. (401) Wood, *4*, **97**: 878; 10. (401.1) Zambonini and Restaino, *22*, **3**: 178; 26 (401.2) Zambonini and Restaino, *22*, **4**: 5; 26. (401.5) Zambonini and Restaino, *22*, **4**: 175; 26. (402) Zhemchuzhnui and Rambach, *93*, **65**: 403; 10. (403) Zweiglówna, *Roczniki Chemji, Varsovie*, 4: 331; 24. (404) Hill and Hill, *1*, **49**: 967; 27. (405) Farrow, *4*, **1927**: 1153. (406) Foote, *12*, **13**: 158; 27. (407) Jäncke, Eissner and Brill, *93*, **160**: 171; 27. (408) Malquori, *22*, **5**: 451; 27. (409) Malquori, *22*, **5**: 510; 27.
(410) Malquori, *22*, **5**: 576; 27. (411) Müller, Müller and Fauvel, *9*, **33**: 134; 27. (412) Blasdale, *Equilibrium in Saturated Salt Solutions*. The Chemical Catalog Co., New York, 1927.

FREEZING-POINT—SOLUBILITY DATA FOR THREE-COMPONENT AQUEOUS SYSTEMS IN WHICH AT LEAST ONE OF THE TWO NON-AQUEOUS COMPONENTS IS EITHER A WEAK ELECTROLYTE OR AN ORGANIC ACID, BASE, OR NON-ELECTROLYTE

Alexander Findlay and William Thomas

Arrangement.—In the following tables, the A-component is always water. The systems are arranged in the order of their B-components according to the standard arrangement (*v.* Vol. III, p. viii), except that B-compounds whose key-formulae begin with 16 follow one another in the ℭ-arrangement. Under each B-component, the C-components follow the above described arrangement of B-components. For abbreviations, *v.* p. 4.

Arrangement.—Dans les tables suivantes, le constituant A est toujours l'eau. Les systèmes sont disposés dans l'ordre de leurs constituants B suivant l'arrangement type (*v.* Vol. III, p. viii), excepté pour les composés B dont la formule clé commence par 16, qui se suivent suivant l'arrangement ℭ. Sous chaque constituant B, les constituants C suivent l'arrangement décrit ci-dessus pour les constituants B. Pour les abréviations, *v.* p. 4.

Anordnung.—In den folgenden Tafeln ist die A-Komponente immer Wasser. Die Systeme sind in der Reihenfolge ihrer B-Komponenten nach der Standardanordnung, (*siehe* Bd. III, S. viii) gereiht, ausgenommen bei denjenigen Kohlenstoffverbindungen, deren Schlüsselformel mit 16 beginnt, folgen diese aufeinander in der ℭ-Anordnung. Unter jeder B-Komponente folgt die C-Komponente in der oben angegebenen Anordnung der B-Komponente. Für Abkürzungen, *siehe* S. 4.

Ordine di disposizione.—Nelle tabelle seguenti il componente A è sempre l'acqua. I sistemi sono disposti secondo i componenti B nell'ordine standard di disposizione (*v.* Vol. III, p. viii). Sono eccettuati i composti la cui formula chiave comincia con 16, i quali si seguono secondo l'ordinamento ℭ. Sotto ciascun componente B, i componenti C seguono la disposizione sopra indicata dei componenti B. Per abbreviazioni, *v.* p. 4.

t = temp., °C

HCl

C = $C_2H_2O_4$, Oxalic acid; t = 30.0° (92)

d^{30}_{30} soln.	Mol/l soln. B	Mol/l soln. C	Mol/l soln. A	d^{30}_{30} soln.	Mol/l soln. B	Mol/l soln. C	Mol/l soln. A
	$C_2H_2O_4.2H_2O$						
1.059	0	1.479	51.15	1.096	4.528	0.555	48.33
1.056	0.503	1.190	51.62	1.117	6.026	0.525	46.89
1.058	0.970	1.032	51.34	1.149	7.907	0.607	44.49
1.065	1.939	0.821	50.83	1.184	9.68	0.871	41.52
1.076	2.959	0.675	50.10				

C = $C_3H_3Cl_3O_3$, Trichlorolactic acid; t = 25° (80)

Mol/l soln. B	Mol/l soln. C	Mol/l soln. B	Mol/l soln. C
$C_3H_3Cl_3O_3$			
1.234	2.545	8.959	0.624
2.837	1.425	10.65	0.57
4.388	0.984	11.86	0.57
5.982	0.760	12.17	0.60
7.675	0.659		

HCl.—(*Continued*)

C = $C_3H_4O_4$
Malonic acid
t = 25° (80)
Mol/l soln.

B	C $C_3H_4O_4$
4.443	3.85
6.210	3.00
8.658	2.36
10.47	2.16
11.09	2.13
11.22	2.15

C = $C_4H_6O_4$
Succinic acid
t = 25°
$C_4H_6O_4$ (56)

4.57	0.235
3.51	0.273
2.41	0.30
1.25	0.430
0.506	0.561
0	0.672

(80)

2.751	0.341
5.964	0.201
7.335	0.177
8.950	0.167
9.732	0.164
10.40	0.169
11.98	0.189

C = $C_4H_6O_6$
Tartaric acid
t = 25° (80)
$C_4H_6O_6$

1.257	4.264
2.568	3.546
4.466	2.717
6.303	2.18
8.144	1.89
9.890	1.72
10.51	1.71
11.17	1.71

C = $C_6H_3N_3O_7$
Picric acid
t = 25° (130)
Mol/100 cm³ soln.

B	C $C_6H_3N_3O_7$
0.025	0.00116
0.050	0.00079
0.075	0.00062
0.100	0.00054
0.146	0.00050
0.2202	0.00051
0.2936	0.00057
0.367	0.00068
0.4404	0.00082
0.5138	0.00098
0.5505	0.00105
0.5872	0.00115
0.6239	0.00123
0.6606	0.00125

C = $C_6H_3N_3O_8$
Styphnic acid
t = 25° (80)
Mol/l soln.

B	C $C_6H_3N_3O_8$
1.410	0.00031
2.814	0.00030
4.221	0.00036
5.634	0.00047
6.997	0.00082
8.418	0.00099
11.10	0.00190
11.16	0.00194

C = $C_6H_4O_2$
Quinone
t = 25° (47)

Mol B/l (A + B)	Mol C/l soln. $C_6H_4O_2$
0	0.1266
0.1	0.1275
1.0	0.1332

C = $C_6H_5NO_3$
m-Nitrophenol
t = 25° (80)
Mol/l soln.

B	C $C_6H_5NO_3$
1.925	0.0849
3.822	0.0834
5.720	0.0885
7.550	0.1009
9.213	0.1130
10.96	0.1284
11.20	0.1307

C = $C_6H_5NO_3$
p-Nitrophenol
t = 25° (80)
Mol/l soln.

B	C $C_6H_5NO_3$
1.650	0.0962
3.277	0.0912
4.993	0.0934
6.552	0.0990
8.196	0.1093
9.817	0.1230
11.29	0.1421

C = C_6H_6O
Phenol
t = 12° (122)
Wt. % soln.

B	C C_6H_6O
0	88.78
0.52	84.5*
10.7	4.8*
15.64	3.98
24.37	3.2
36.25	3.5

* Two liquid phases.

C = $C_6H_6O_2$
Catechol
t = 25° (80)
Mol/l soln.

B	C $C_6H_6O_2$
1.68	1.07
3.53	0.59
5.39	0.41
7.30	0.31
9.11	0.28
10.83	0.28

C = $C_6H_6O_2$
Resorcinol
t = 25° (80)
$C_6H_6O_2$

0.656	2.853
1.671	2.285
3.410	1.510
4.402	1.154
6.076	0.808
7.567	0.644
9.157	0.563
9.610	0.559
11.31	0.695

C = $C_6H_6O_2$
Hydroquinol
t = 25° (47)

Mol B/l (A + B)	Mol C/l soln. $C_6H_6O_2$
0	0.645
0.01	0.645
0.1	0.633
1.0	0.494

t = 25° (80)
Mol/l soln.

B	C $C_6H_6O_2$
1.892	0.201
3.793	0.141
5.729	0.108
7.597	0.094
9.237	0.089
10.97	0.083

C = $C_6H_6O_3$
Pyrogallol
t = 25° (80)
$C_6H_6O_3$

1.53	0.94
3.18	0.62
5.12	0.42
6.86	0.34
8.68	0.30
10.43	0.31
10.48	0.31

C = $C_6H_8O_7$
Citric acid
t = 25° (80)
$C_6H_8O_7$

0.949	3.68
2.189	3.10
3.795	2.45
5.718	1.79

C = $C_6H_8O_7$.—(*Continued*)
Mol/l soln.

B	C $C_6H_8O_7$
7.736	1.36
9.635	1.15
10.36	1.12
11.09	1.10

C = $C_7H_4N_2O_6$
3, 5-Dinitrobenzoic acid
t = 25° (80)
$C_7H_4N_2O_6$

1.565	0.00398
2.908	0.00470
4.594	0.00583
5.657	0.00690
7.336	0.00841
8.855	0.00965
10.27	0.01095
11.73	0.01240

C = $C_7H_5NO_4$
o-Nitrobenzoic acid
t = 25° (74)

Mol B/l (A + B)	Mol C/l soln. $C_7H_5NO_4$
0	0.0434
0.0179	0.0368
0.0357	0.0339
0.125	0.0298
0.25	0.0292
0.5	0.0285

t = 25° (80)
Mol/l soln.

B	C $C_7H_5NO_4$
1.314	0.0280
2.607	0.0256
3.909	0.0239
5.013	0.0235
6.509	0.0233
7.795	0.0237
9.080	0.0250
10.30	0.0267

C = $C_7H_5NO_4$
m-Nitrobenzoic acid
t = 25° (80)
$C_7H_5NO_4$

1.416	0.0175
3.310	0.0178
4.308	0.0183
5.593	0.0205
7.044	0.0225
8.380	0.0256
9.793	0.0293
11.54	0.0368

C = $C_7H_5N_3O_7$
Methylpicric acid
t = 25° (74)

Mol B/l (A + B)	Mol C/l soln. $C_7H_5N_3O_7$
0.00895	0.00641
0.01593	0.00487

C = $C_7H_6O_2$
Benzoic acid
$t = 25°$ (75)

Mol B/l (A + B)	Mol C/l soln.
	$C_7H_6O_2$
0.0	0.0276
0.2828	0.0254
0.6308	0.0235
1.180	0.0211
1.848	0.0185
3.308	0.0153
4.410	0.0140
5.238	0.0130
7.172	0.0113
9.522	0.0109

C = $C_7H_6O_3$
Salicylic acid
$t = 25°$
$C_7H_6O_3$ (74)

0	0.01634
0.0179	0.01290
0.0357	0.01238
0.125	0.01214
0.25	0.01194
0.5	0.01123
(75)	
0	0.0162
0.500	0.0112
1.180	0.0101
1.848	0.00912
2.498	0.00834
3.308	0.00777
4.410	0.00732
7.172	0.00695
9.552	0.00721
11.73	0.00768

Mol/l soln. (80)

B	C
	$C_7H_6O_3$
1.46	0.00982
3.06	0.00822
4.37	0.00715
6.16	0.00654
7.31	0.00656
8.73	0.00666
10.2	0.00710
11.5	0.00794
12.2	0.00856

C = $C_8H_6O_4$
Phthalic acid
$t = 25°$ (80)

	$C_8H_6O_4$
1.729	0.0211
3.113	0.0149
4.693	0.0108
6.100	0.0086
7.603	0.00675
9.150	0.0060
10.63	0.0064
12.05	0.00685

C = $C_8H_6O_4$.—(*Continued*)
$t = 25.00°$ (108)

Mol B/l (A + B)	C,* Rel. solubility
	$C_8H_6O_4$
0.217	0.768
0.639	0.697
1.175	0.620
1.915	0.494
1.936	0.486

* Unit of solubility is that in pure H_2O, which = 0.04185 g-Mol/l; (d_4^{25} = 1.0022).

C = $C_8H_8O_2$
Phenylacetic acid
$t = 25°$ (80)
Mol/l soln.

B	C
	$C_8H_8O_2$
1.417	0.0984
2.890	0.0833
4.313	0.0763
5.770	0.0739
7.175	0.0756
8.590	0.0815
9.888	0.0916
11.36	0.1099

C = $C_8H_8O_3$
Mandelic acid
$t = 25°$ (80)

	$C_8H_8O_3$
1.202	0.691
2.48	0.488
3.75	0.387
5.02	0.332
6.27	0.307
7.52	0.302
8.75	0.316
9.94	0.353
10.35	0.375

C = $C_8H_{14}O_4$
Suberic acid
$t = 25°$ (80)

	$C_8H_{14}O_4$
1.423	0.0249
2.858	0.0214
4.281	0.0206
5.691	0.0216
7.130	0.0252
8.278	0.0317
9.865	0.0453
11.20	0.0685

C = $C_9H_8O_2$
Cinnamic acid
$t = 25°$ (80)

	$C_9H_8O_2$
2.100	0.00283
4.174	0.00272
6.250	0.00318
8.007	0.00400
10.29	0.00556
10.47	0.00572

C = $C_{10}H_8O$
Naphthol
$t = 25°$ (80)
Mol/l soln.

B	C
	$C_{10}H_8O$
1.466	0.00410
2.952	0.00360
4.343	0.00333
5.785	0.00319
7.122	0.00316
8.674	0.00307
11.47	0.00341

C = $C_{10}H_8SO_3$
β-Naphthalenesulfonic acid
$t = 30.1°$ (92)

d_{30}^{30} soln.	Mol/l soln. B	C	A
	$C_{10}H_8SO_3.2H_2O$		
1.1925	0	3.263	28.20
1.1653	1.291	2.470	33.25
1.1553	1.826	2.117	35.69
1.1115	4.017	0.762	44.49
1.1197	7.232	0.089	46.21
1.1569	9.88	0.063	43.21

C = $C_{10}H_{14}O$ (125)
Thymol

Mol B/l (A + B)	g C/l soln. 25°	37.5°
	$C_{10}H_{14}O$	
0.0	0.995	1.32
0.1	0.968	1.29
0.5	0.884	1.21
1.0	0.802	1.12
2.5	0.612	0.935
5.0	0.445	0.772

C = $C_{12}H_{10}O_4$
Quinhydrone
$t = 25°$ (47)

Mol B/l (A + B)	Mol C/l soln.
	$C_{12}H_{10}O_4$
0	0.0178
0.1	0.0173
1.0	0.0162

C = $C_{12}H_{11}N$
Diphenylamine
$t = 25°$ (36)

	$C_{12}H_{11}N$
0	0.000277
0.211	0.000507

C = $C_{14}H_8O_2$
Phenanthraquinone
$t = 25°$ (80.1)

Mol B/l soln.	g C/l soln.
	$C_{14}H_8O_2$
3.11	0.012
4.25	0.016
5.12	0.023
6.05	0.029
7.20	0.046

C = $C_{14}H_8O_2$.—(*Continued*)

Mol B/l soln.	g C/l soln.
	$C_{14}H_8O_2$
8.50	0.058
9.25	0.088
10.8	0.157

C = $C_{14}H_{10}O_3$
Diphenyleneglycolic acid
$t = 25°$ (80)
Mol/l soln.

B	C
	$C_{14}H_{10}O_3$
1.952	0.00492
3.907	0.00355
5.843	0.00343
7.745	0.00352

C = $C_{14}H_{10}O_4$
Diphenic acid
$t = 25°$ (80)

	$C_{14}H_{10}O_4$
2.103	0.00091
3.985	0.00072
5.928	0.00056
7.748	0.00059

C = $C_{14}H_{12}O_2$
Diphenylacetic acid
$t = 25°$ (80)

	$C_{14}H_{12}O_2$
1.620	0.00047
2.913	0.00040
4.512	0.00036
5.973	0.00038
7.349	0.00041
8.889	0.00042
10.27	0.00046
11.74	0.00053

C = $C_{14}H_{12}O_3$
Benzilic acid
$t = 25°$ (80)

	$C_{14}H_{12}O_3$
1.537	0.00332
2.977	0.00233
4.440	0.00182
5.934	0.00172
7.356	0.00150
8.803	0.00167
10.25	0.00195
11.69	0.00217

C = $C_{24}H_{19}NO_3S$
Triphenylsulfanilic acid (73)

HBr

C = $C_4H_6O_4$
Succinic acid
$t = 25°$ (56)
Mol/l soln.

B	C
	$C_4H_6O_4$
0	0.672
0.98	0.486
3.39	0.278

I_2

C = $C_3H_8O_3$
Glycerol; *v. also* p. 266
t = 25° [58]

g B/kg (A + B)	Wt. % C in (A + B)
I_2	
9.68	100
6.1	90
3.8	80
2.3	70
1.7	60
1.2	50
0.79	40
0.3	0

H_2S

C = CaS
t = 20° [106]
g/l soln.

B	C
CaS	
1.091	2.673
1.504	3.303
3.007	3.974

H_2SO_4

C = $CH_4N_4O_2$ [27]
Nitroguanidine

Vol. % B in (A+B)	g C/l soln. 0°	g C/l soln. 25°
$CH_4N_4O_2$		
45	58	109
40	34	80
35	20	52
30	13	29
25	7.5	18
20	4.5	10.5
15	3.0	5.5
0	1.2	4.2

t = 13° [34]

Wt. % B in (A + B)	g C/kg (A + B)
$CH_4N_4O_2$	
33.2	25.5
28.2	13.7
25.2	9.5
22.7	8.7
20.0	7.2
17.2	6.5
5.8	3.7

C = $C_2H_2O_4$
Oxalic acid
t = 25° [80]
Mol/l soln.

B	C
$C_2H_2O_4$	
1.094	0.760
2.262	0.529
3.418	0.396
4.613	0.338
5.725	0.346
6.815	0.415
7.785	0.579
8.575	0.902

C = $C_3H_3Cl_3O_3$
Trichlorolactic acid
t = 25° [80]
Mol/l soln.

B	C
$C_3H_3Cl_3O_3$	
1.263	1.896
3.083	0.671
4.794	0.353
6.375	0.26
8.14	0.15
9.69	0.18
11.14	0.21
12.69	0.26

C = $C_3H_4O_4$
Malonic acid
t = 25° [80]

$C_3H_4O_4$	
1.364	5.72
3.525	3.40
5.88	2.04
8.03	1.51
9.96	1.60
10.92	2.28

C = $C_4H_6O_4$
Succinic acid
t = 25° [80]

$C_4H_6O_4$	
0.99	0.454
1.91	0.342
2.47	0.282
4.06	0.194
5.1	0.17
6.9	0.15
8.6	0.15
10.2	0.20
11.6	0.35

C = $C_4H_6O_6$
Tartaric acid
t = 25° [80]

$C_4H_6O_6$	
0.90	4.26
2.02	3.32
3.40	2.37
4.95	1.59
6.27	1.22
7.73	0.975
9.05	0.885
9.93	0.93
11.1	1.37

C = $C_6H_4N_2O_4$
Dinitrobenzene [66]
Diagrams given

C = $C_6H_8O_7$
Citric acid
t = 25° [80]
Mol/l soln.

B	C
$C_6H_8O_7$	
0.84	3.52
2.10	2.66
3.57	1.87
5.42	1.09
5.73	1.02
7.12	0.74

C = $C_6H_8O_7$.—(*Continued*)
Mol/l soln.

B	C
$C_6H_8O_7$	
9.09	0.59
10.29	0.67
11.18	0.96

C = $C_7H_5N_3O_6$
Trinitrotoluene [66]
Diagrams given

C = $C_8H_8O_3$
Mandelic acid
t = 25° [80]

$C_8H_8O_3$	
1.348	0.484
2.695	0.278
4.147	0.186
5.53	0.18
6.81	0.18
8.25	0.16
9.45	0.23
10.58	0.27

C = $C_8H_{10}N_4O_2$
Caffeine
t = 25° [33]

Mol B/l (A + B)	g C/l soln.
$C_8H_{10}N_4O_2$	
0.5	33.61
0.5	33.51

C = $C_8H_{14}O_4$
Suberic acid
t = 25° [80]
Mol/l soln.

B	C
$C_8H_{14}O_4$	
0.929	0.02
2.617	0.019
3.767	0.021
5.67	0.03
9.33	0.010

C = $C_{14}H_8O_2$
Phenanthraquinone
t = 25° [80.1]

Mol B/l soln.	g C/l soln.
$C_{14}H_8O_2$	
2.98	0.008
3.50	0.0095
4.74	0.012
5.8	0.019
6.8	0.030
7.6	0.043
8.6	0.082
9.3	0.116

HNO_3

C = $CH_4N_4O_2$
Nitroguanidine
t = 13° [34]

Wt. % B in (A + B)	g C/kg (A + B)
$CH_4N_4O_2$	
27	23.0
23	14.7
19	9.7
15.5	8.2
6.4	4.7

C = $C_2H_2O_4$
Oxalic acid
t = 30.0° [92]
Mol/l soln.

B	C	A
	$C_2H_2O_4.2H_2O$	
0	1.479	51.15
0.478	1.268	50.84
1.606	1.039	49.60
2.453	0.933	48.50
4.224	0.790	45.74
7.600	0.661	39.63
9.59	0.639	35.51
11.84	0.696	30.17
13.62	0.847	25.15
14.12	0.966	23.48
	$C_2H_2O_4$*	
15.59	1.114	19.03
16.92	0.840	16.42
20.84	0.524	6.38
21.23	0.531	5.20
21.57	0.548	4.07
21.63	0.553	4.01

* Solubility curves of $C_2H_2O_4$ and $C_2H_2O_4.2H_2O$ intersect at *ca.* B = 14.8.

C = $C_4H_6O_4$
Succinic acid
t = 25° [80]
Mol/l soln.

B	C
$C_4H_6O_4$	
1.299	0.567
3.034	0.471
5.236	0.362
6.616	0.326
9.710	0.264
11.11	0.259
13.51	0.281
15.43	0.366

C = $C_6H_3N_3O_7$
Picric acid
t = 25° [80]

$C_6H_3N_3O_7$	
1.022	0.0108
2.059	0.0124
4.161	0.0237
6.289	0.0405
8.334	0.0612
10.47	0.1006
12.47	0.1763
14.29	0.3533

C = $C_6H_3N_3O_8$, Styphnic acid
t = 25° (80)
Mol/l soln.

B	C
	$C_6H_3N_3O_8$
1.785	0.000702
4.171	0.00109
6.234	0.001637
8.368	0.002554
10.31	0.00397
11.97	0.00649
13.97	0.01371
15.57	0.02806

C = $C_7H_6O_2$, Benzoic acid
t = 25° (75)

	$C_7H_6O_2$
0.0	0.0276
0.0208	0.0272
0.0807	0.0269
0.1351	0.0268
0.2021	0.0268
0.5514	0.0270
1.019	0.0271
1.623	0.0272
2.430	0.0275
3.883	0.0277
4.784	0.0284

C = $C_7H_6O_3$
Salicylic acid
t = 25° (75)

	$C_7H_6O_3$
0.0	0.0162
0.0109	0.0149
0.0420	0.0140
0.0807	0.0139
0.2408	0.0141
0.5514	0.0150
1.019	0.0184

C = $C_8H_6O_4$
Phthalic acid
t = 25° (80)

	$C_8H_6O_4$
2.08	0.0291
4.08	0.0235
6.72	0.0188
9.04	0.0166
10.40	0.0163
12.60	0.0175
14.42	0.0210
15.99	0.0289

C = $C_8H_{14}O_4$, Suberic acid
t = 25° (80)

	$C_8H_{14}O_4$
0.307	0.0297
0.555	0.0295
0.906	0.0317
1.543	0.0348
2.021	0.0420
4.035	0.0500
5.749	0.0567
8.091	0.0788
10.05	0.1116
11.77	0.1948
13.30	0.3025

C = $C_{14}H_8O_2$
Phenanthraquinone
t = 25° (80.1)

Mol B/l (A + B)	g C/l soln.
	$C_{14}H_8O_2$
4.26	0.049
4.54	0.053
5.02	0.067
6.15	0.099
6.70	0.118
7.20	0.157
7.45	0.175
8.30	0.227

NH_3

C = As_2O_3
t = 25° (120)
Wt. % soln.

B	C
	As_2O_3
0	2.26
1.41	10.98
2.78	20.49
2.86	21.17
	NH_4AsO_2
2.88	18.43
3.13	12.30
3.18	11.13
3.91	7.63
5.82	5.61
6.95	4.72
9.25	3.44
9.93	3.20
10.06	3.14
13.98	2.50
14.28	2.16

C = $C_4H_{12}IN$
Tetramethylammonium iodide
t = 25° (61)

Mol B/l (A + B)	g C/l soln.
	$C_4H_{12}IN$
0.0	52.76
0.049	52.71
0.100	52.86
0.210	52.62
0.522	52.58
1.015	52.38
2.110	52.03

C = $C_{17}H_{19}NO_3$ (51)
Morphine

Mol B/l (A + B)	g C/l (A + B) 18°	25°
	$C_{17}H_{19}NO_3$	
0.1	0.876	0.974
0.2	1.226	1.238
0.588	2.478	2.548
1.0	3.086	3.242
2.941	4.316	4.404
5.88	6.380	7.100

C = $C_{19}H_{22}N_2O$
Cinchonine
t = 20° (114)

Wt. % B in (A + B)	g C/kg (A + B)
	$C_{19}H_{22}N_2O$
0.0	1.30
10	4.13

C = $C_{21}H_{22}N_2O_2$
Strychnine
t = 20° (114)

	$C_{21}H_{22}N_2O_2$
0.0	0.39
10	2.57

C = $Hg(CN)_2$
t = 0° (14)
Wt. % soln.

B	C
	$Hg(CN)_2$
0.0	6.31
0.43	8.46
	$Hg(CN)_2 + Hg(CN)_2.NH_3$
1.08	11.68
	$Hg(CN)_2.NH_3$
2.06	9.40
2.74	9.44
4.08	10.32
6.82	15.43
7.67	17.51
8.25	19.31
9.40	24.68
	$Hg(CN)_2.NH_3 + Hg(CN)_2.2NH_3$
9.52	25.45
	$Hg(CN)_2.2NH_3$
11.23	24.04
12.59	23.40
16.87	24.46
22.09	43.57
21.51	66.10
29.70*	79.30*

* Extrapolated.

C = $Al(OH)_3$ (3)

NH_4Cl

C = CH_4O
Methyl alcohol (5)

g B/kg A 0°	25°	Mol C/kg A
	NH_4Cl	
298.4	395.1	0
297.4	394.8	0.25
296.6	393.9	0.50
292.7	392.9	1.0
283.2	386.2	3.0

C = C_2H_6O
Ethyl alcohol

g B/kg A 0° (5)	25° (4)	Mol C/kg A
	NH_4Cl	
298.4	395.1	0
295.5	396.4	0.25
292.0	390.6	0.50
286.4	387.0	1.0
266.3	371.2	3.0
	358.7	5.0

C = C_3H_6O
Acetone
t = 25° (69)

Mol B/l soln.	Vol. % C in (A + B)
	NH_4Cl
	One liquid phase
5.851	0
5.341	10
4.646	20
3.967	30
3.285	40
	Two liquid phases
2.837	46.5
0.189	85.7
	One liquid phase
0.094	90

C = C_3H_8O (5)
Propyl alcohol

g B/kg A 0°	25°	Mol C/kg A
	NH_4Cl	
298.4	395.1	0
295.4	393.5	0.25
291.3	390.8	0.50
284.0	384.8	1.0

C = $C_8H_6O_4$
Phthalic acid
t = 25.00° (108)

Mol B/l (A + B)	C,* Rel. solubility
	$C_8H_6O_4$
0.1403	0.99
0.286	0.96
0.580	0.92
0.888	0.885
1.350	0.82
1.895	0.735

* Unit of solubility is that in pure H_2O, which = 0.04185 g-Mol/l; (d_4^{25} = 1.0022).

NH_4ClO_4

C = C_2H_6O
Ethyl alcohol (136)

$t°$	g B/kg soln.	Vol. % C in (A+B)
	NH_4ClO_4	
14.2	17.35	0
25.2	19.65	98.8

$(NH_4)_2SO_4$

C = C_3H_6O

Acetone; *v. also* Vol. III, p. 400

t = 30° (69)

g/kg soln.

A	C	B
	$(NH_4)_2SO_4$	
	One liquid phase	
562	0	438
	Two conjugate liquid phases	
	Aqueous layer	
565	13.0	422.0
604.7	12.2	383.1
644.0	16.0	340.0
675.1	66.7	258.2
674.5	86.5	239.0
680.5	165.0	154.5
680	210	110*
	Acetone layer	
680	210	110*
655.9	263.0	81.1
612.4	340.4	47.2
507.7	472.0	20.3
386.3	609.0	4.7
265.2	731.5	3.3
233.3	765.4	1.3
	One liquid phase	
121.4	878.0	0.6

t = 0° (69)

g/kg soln.

A	C	B
	$(NH_4)_2SO_4$	
	Limiting conjugate solutions	
612	8.5	379.5
422.9	571	6.1

* Critical solution.

CH_2O

Formaldehyde

C = Amino acids (131)

$$\frac{C_{\mathrm{HCHO}} \times C_{\mathrm{acid}}}{C_{\mathrm{HCHO\text{-}acid}}} = K$$

Acid	K
$C_2H_5NO_2$, glycine	1.73
$C_3H_7NO_2$, alanine	14.1
$C_4H_7NO_4$, aspartic acid	25.7
$C_5H_9NO_4$, glutamic acid	30.7
$C_5H_{11}NO_2$, valine	28.9
$C_6H_{13}NO_2$, leucine	36.8

CH_2O_2

Formic acid

C = $C_2H_2O_4$

Oxalic acid

t = 25° (80)

Mol/l soln.

B	C
	$C_2H_2O_4$
0.097	1.191
0.437	1.193
0.967	1.206
1.287	1.207
1.825	1.221
2.678	1.215
5.360	1.163
8.13	1.066
11.00	0.934
12.17	0.879
16.63	0.748
19.25	0.784
21.11	1.170

C = $C_4H_6O_4$

Succinic acid

t = 25° (80)

B	C
	$C_4H_6O_4$
0.090	0.685
0.446	0.699
0.930	0.704
3.730	0.751
5.547	0.766
7.500	0.725
11.29	0.614

C = $C_7H_5NO_4$

o-Nitrobenzoic acid

t = 25° (74)

Mol B/l (A + B)	Mol C/l soln.
	$C_7H_5NO_4$
0.05168	0.04304
0.09977	0.04266

C = $C_7H_6O_3$

Salicylic acid

t = 25° (74)

Wt. % B in (A + B)	Mol C/l soln.
	$C_7H_6O_3$
0.0	0.01633
0.24	0.01531
0.46	0.01474
0.625	0.01484
1.25	0.01496
2.5	0.01536
5.0	0.01716
10.0	0.02101

C = $C_8H_8O_3$

Mandelic acid

t = 25° (80)

Mol/l soln.

B	C
	$C_8H_8O_3$
2.268	1.768
4.340	2.180
6.320	2.383
8.09	2.430
10.38	2.434
12.20	2.525
13.41	2.750
13.78	3.327

C = $C_9H_9NO_3$

Hippuric acid

t = 25° (74)

Wt. % B in (A + B)	Mol C/l soln.
	$C_9H_9NO_3$
0	0.02047
1.25	0.02014
2.5	0.02078
5	0.02275
10	0.02661

C = $C_{10}H_8$

Naphthalene (20)

Wt. % soln.

B (t = 0°)	C (t = 0°)	B (t = 25°)	C (t = 25°)
	$C_{10}H_8$		
76.6	0.106	56.2	0.089
84.5	0.188	67.8	0.168
92.2	0.331	81	0.4
97.7	0.477	91.6	0.725
		97	1.185

CH_4O

Methyl alcohol

C = $C_{10}H_8$ (20)

Naphthalene

Wt. % soln.

B (t = 0°)	C (t = 0°)	B (t = 25°)	C (t = 25°)
	$C_{10}H_8$		
80.7	0.91	43.10	0.11
86.82	1.83	56.5	0.34
95.32	3.72	65.1	0.75
		69.52	1.18
		79.2	2.4
		86.5	4.55
		90.86	8.77
		91	8.84

C = $UO_2(HCO_2)_2$

t = 18° (23)

Vol % B in (A + B)	g C/kg (A + B)
	$UO_2(HCO_2)_2$
100	49.0
90	Tr.

C = $BaCl_2$ (78)

C = NaCl (5)

Mol B/kg A	g C/kg A 0°	g C/kg A 25°
	NaCl	
0	357.8	363.0
0.25	355.2	359.4
0.50	353.1	357.6
1.0	347.5	353.2
3.0		336.7

C = $Na_2Sb_2O_6.6H_2O$ (139)

Solvent Vol. % B	Solvent d_4^{15}	g C/l soln. 18°	g C/l soln. 25°	g C/l soln. 33.5°
		$Na_2Sb_2O_6.6H_2O$		
0		0.564	0.738	1.018
20	0.9734	0.120	0.193	0.270
33.3	0.9559	0.044	0.095	0.150
50	0.9298	0.006	0.031	0.062

C = $NaC_6H_3N_2O_5.H_2O$

2, 4-Dinitrophenate

t = 25° (38)

Vol. % B in (A + B)	g C/l soln.
	$NaC_6H_3N_2O_5.H_2O$
0	44.61
10	36.86
20	31.96
30	29.50
40	28.54
50	28.24
60	27.92
70	26.72
80	25.18
90	24.75
100	46.51

C = KCl (5)

Mol B/kg A	g C/kg A 0°	g C/kg A 25°
	KCl	
0	283.6	364.2
0.25	280.0	361.9
0.50	276.4	357.1
1.0	267.9	348.7
3.0	238.1	324.2

C = $KC_6H_2N_3O_7$

Picrate

t = 25° (38)

Vol. % B in (A + B)	g C/l soln.
	$KC_6H_2N_3O_7$
0	6.45
10	5.42
20	4.70
30	4.44
40	4.22
50	4.11
60	4.10
70	3.96
80	3.32
90	2.54
100	2.74

CH_3NO

Formamide

C = NaCl

t = 25° (107)

g B/l soln.	Mol C/l soln.
	NaCl
0	5.44
23	5.30
53	5.28
80	5.20
110	4.98
150	4.89
188	4.75

C = Na_2SO_4

t = 25° (91)

g/100 g soln.

B	C
	$Na_2SO_4.10H_2O$
0	21.88
4.93	21.23

C = Na_2SO_4.—(*Continued*)

g/100 g soln.

B	C
$Na_2SO_4.10H_2O$ + (?)	
15.82	21.40
(?)	
16.97	20.85
21.70	17.90
$4Na_2SO_4.CH_3NO$	
24.09	16.12
42.96	8.69
85.18	1.76
95.97	1.02

CH_4N_2O

Urea

C = Various organic and inorganic acids

No numerical results, *v.* (138)

C = NaCl

t = room (?) (37)

g B/100 cm³ soln.	Δ
NaCl	
10	0.124
20	0.372
30	0.709
40	1.134
50	1.602

Δ = increase in solubility of C in grams.

t = 25° (107)

g B/l soln.	Mol C/l soln.
NaCl	
0	5.44
50	5.24
96	4.97
130	4.87
180	4.73
230	4.66
280	4.55

CH_4N_2S

Thiourea

C = $(NH_4)CNS$ (77); *cf.* (129)

Mol % soln.

B	C	B	C
$(NH_4)CNS$			
t = 0°		t = 25.5°	
2.9	0	5.2	4.3
1.7	3.8	6.0	6.8
2.2	4.4	5.8	7.0
2.1	4.9	4.8	9.8
2.1	5.0	4.4	12.3
2.4	6.6	4.6	12.3
1.3	7.6	4.4	14.6
1.3	9.6	4.3	14.9
2.1	21.6	4.4	15.4
1.3	21.8	3.9	18.1
0	22.4	4.1	19.5
		4.3	20.9
t = 50°		4.1	23.6
0	39.1	4.4	24.0
2.6	39.9	4.0	24.1
7.6	39.6	3.9	26.9
8.2	38.1	4.0	27.6

C = $(NH_4)CNS$.—(*Cont'd*)

Mol % soln.

B	C	B	C
$(NH_4)CNS$			
t = 50°		t = 25.5°	
10.2	13.2	3.3	29.4
12.7	9.4	3.3	29.6
12.4	4.7	2.9	29.8
10.9	0	4.3	29.9
		4.2	30.0
		4.0	30.0
		1.8	30.0
		0	30.0

C = AgBr (94)

$(NH_4)_2CO_3$

C = C_2H_6O

Ethyl alcohol (16)

g B/kg (A + B)	Wt. % C in (A + B)
$(NH_4)_2CO_3$	
t = 6.5°	
724	0.0
582	7.1
407	15.2
246	25.0
188	29.1
34	48.3
t = 9°	
734	0.0
668	3.6
578	6.8
528	10.0
439	13.9
376	16.2
313	22.1
t = 15°	
742	0.0
527	11.5
486	14.0
59	46.6
50	49.2
17	58.9
3	71.8
1	78.5
0	93.3

$C_2H_2O_4$

Oxalic acid

C = $C_2H_4O_2$, Acetic acid

t = 25° (80)

Mol B/l soln.	Mol C/l soln.
$C_2H_2O_4$	
1.178	0.135
1.181	0.321
1.198	0.923
1.201	1.361
1.201	1.844
1.176	3.563
1.084	5.721
0.920	8.005
0.773	9.864
0.550	12.55
0.448	14.03
0.438	14.21
0.401	14.83

C = $(NH_4)_2C_2O_4$ (144)

Oxalate

D = $C_2H_2O_4.2H_2O$

E = $(NH_4)_2C_2O_4.2C_2H_2O_4.4H_2O$

F = $C_2H_2O_4.(NH_4)_2C_2O_4.2H_2O$

Wt. % soln.

B	C	B	C
t = 30°		t = 45°	
D		D	
12.36	0.14	21.01	0
D + E		21.22	0.22
12.70	0.29	21.09	0.25
E		21.21	0.27
10.46	0.37	21.32	0.30
11.44	0.43	21.31	0.31
8.87	0.47	D + E	
11.36	0.97	21.31	0.53
5.65	0.91	E	
4.65	1.14	21.23	0.56
3.55	3.60	20.55	0.61
4.00	5.91	20.92	0.54
E + F		20.88	0.51
4.21	5.98	16.44	0.79
F		12.28	1.23
4.08	6.21	7.98	2.16
3.56	6.79	5.83	3.54
3.82	6.73	5.67	5.65
3.96	6.02	5.55	6.72
F + C		E + F	
3.28	8.35	6.53	8.75
C		F	
2.76	7.40	6.27	8.93
0.22	5.53	6.14	9.04
		F + C	
		5.00	12.33
		C	
		3.04	8.31
		1.45	9.59

C = $C_3H_6O_3$, Lactic acid

t = 25° (80)

Mol B/l soln.	Mol C/l soln.
$C_2H_2O_4$	
1.114	1.337
1.027	2.718
0.928	4.051
0.817	5.357
0.706	6.477
0.586	7.647
0.469	8.709
0.416	9.52

C = $Th(C_2O_4)_2$, Oxalate

t = 25° (50)

Mol B/kg soln.	g C/kg soln.
$Th(C_2O_4)_2.6H_2O$	
0.5	0.0023
satd. soln.	0.0046

t = 50° (22)

g B/kg soln.	g C/kg soln.
$Th(C_2O_4)_2$	
17	0.0035
65	0.012

C = $Th(C_2O_4)_2$.—(*Cont'd*)

g B/kg soln.	g C/kg soln.
$Th(C_2O_4)_2$	
93	0.018
230	0.052

C = H_3BO_3

Boric acid

t = 25° (55)

Mol/l soln.

B	C
H_3BO_3	
0	0.901
0.297	0.995
0.595	1.08
1.377	1.198
$C_2H_2O_4$	
1.181	0
1.197	0.088
1.205	0.156
1.252	0.557
1.377	1.198

C = BeC_2O_4

Oxalate

t = 25° (143)

Mol B/kg soln.	g C/kg soln.
$BeC_2O_4.3H_2O$	
0.0	24.94
0.05	27.80

C = KOH

D = $C_2H_2O_4.2H_2O$

E = $KHC_2O_4.C_2H_2O_4.2H_2O$

F = KHC_2O_4

G = $C_2H_2O_4.2K_2C_2O_4.2H_2O$

H = $K_2C_2O_4.H_2O$

t = 25° (49)

g/kg soln.

K_2O	C_2O_3
D	
0	82.90
D + E	
0.45	82.78
E	
0.64	74.12
2.38	28.27
2.46	24.45
3.46	20.07
5.55	17.90
5.67	17.34
17.14	26.75
20.52	30.79
E + F	
23.60	34.50
F	
31.99	37.93
59.19	54.57
F + G	
119.6	98.16
G + H	
157.1	123.65
H	
155.1	118.5

$C_2H_2O_4$.—(*Continued*)

C = $K_2C_2O_4$, Oxalate
D = $C_2H_2O_4.2H_2O$
E = $C_2H_2O_4.K_2C_2O_4.4H_2O$
F = $C_2H_2O_4.K_2C_2O_4.2H_2O$
G = $K_2C_2O_4.H_2O$
t = 15° (71)
g/kg soln.

B	C
D	
71.0	0.0
D + E	
72.9	0.04
E	
35.9	2.82
10.08	10.1
9.20	13.9
12.2	25.6
E + F	
15.6	34.5
F	
14.8	37.6
8.8	98.8
F + G	
2.7	250.0
G	
1.4	245.6
0.0	242.0

$C_2H_3Cl_3O_2$

Chloral hydrate
C = C_6H_6
Benzene (17)

Mol B/kg H_2O soln.	Mol B/kg C_6H_6 soln.	Δt
	C_6H_6	
5.125	0.675	1.305
5.066	0.623	1.229
4.872	0.585	1.180
4.424	0.545	1.104
3.890	0.290	0.714
2.419	0.200	0.539
1.309	0.105	0.314
0.663	0.050	0.184
0.339	0.025	0.114

Δt = freezing-point depression of C.

C = K_2SO_4; t = 25° (42)
Wt. % soln.

B	C
	K_2SO_4
6.44	9.13
9.09	8.41
12.38	7.79
13.20	7.31
22.07	5.88
33.15	4.54
44.40	3.36
47.30	2.92
62.82	2.00
70.28	1.75
80.36	1.40
85.26	1.08

$C_2H_4O_2$

Acetic acid
C = $C_4H_6O_4$
Succinic acid
t = 25° (80)
Mol/l soln.

B	C
	$C_4H_6O_4$
0.078	0.692
0.448	0.708
0.916	0.726
2.828	0.796
4.536	0.822
6.655	0.820
8.661	0.760
10.34	0.679
12.40	0.549
14.64	0.399
16.85	0.257

C = $C_4H_6O_6$
Tartaric acid
t = 25° (80)

B	C
	$C_4H_6O_6$
0.25	5.45
0.60	4.938
1.23	4.758
2.63	4.359
4.24	3.859
6.12	3.274
8.30	2.576
10.89	1.753
14.14	0.797
16.92	0.172

C = C_6H_6
Benzene
t = solidification temp. of mixture (17); *cf.* (109)
Mol/kg

B C_6H_6 soln.	A satd. soln.
C_6H_6	
0.0	0.07
2.31	0.180
3.89	0.239
4.26	0.313

Mol B/100 g H_2O soln.	Mol B/100 g C_6H_6 soln.	Δt
	C_6H_6	
1.1870	0.4245	8.930
1.2720	0.4130	8.713
0.8727	0.387	8.189
0.9976	0.383	8.100
1.0965	0.374	7.914
0.7070	0.2145	4.699
0.7272	0.2025	4.447
0.7859	0.1730	3.831
0.6806	0.1205	2.753
0.3961	0.035	0.980
0.2130	0.020	0.560

Δt = freezing-point depression of C.

C = $C_7H_6O_3$
Salicylic acid
t = 25° (74)

Wt. % B in (A + B)	Mol C/l soln.
	$C_7H_6O_3$
0	0.01631
0.625	0.01691
1.25	0.01745
2.5	0.01846
5	0.02059

C = $C_7H_7NO_2$
m-Aminobenzoic acid
t = 25° (8)
Wt. % soln.

B	C
	$C_7H_7NO_2$
0.0	0.765
0.006	0.758
0.060	0.786
0.597	0.838
6.01	1.29
14.02	2.66
26.84	5.03
46.86	7.45
90.77	9.23

C = $C_8H_6O_4$
Phthalic acid
t = 25.00° (108)

Mol B/l (A + B)	C,* Rel. solubility
	$C_8H_6O_4$
0.1905	1.034
0.3484	1.063
0.732	1.177
1.039	1.245
1.523	1.372
2.016	1.575

* Unit of solubility is that in pure H_2O, which = 0.04185 g-Mol/l; (d_4^{25} = 1.0022).

C = $C_8H_7Cl_2NO$
2, 4-Dichloroacetanilide
t = room (99)

Wt. % B in (A + B)	g C/l (A + B)
	$C_8H_7Cl_2NO$
100	64
50	8

C = $C_8H_8N_2O_3$
p-Nitroacetanilide
t = room (99)

	$C_8H_8N_2O_3$
100	8
50	4

C = $C_8H_8O_3$
Mandelic acid
t = 25° (80)

Mol B/l soln.	Mol C/l soln.
	$C_8H_8O_3$
0.87	1.81
1.34	2.31
1.86	2.66
2.62	3.19

C = $C_8H_8O_3$.—(*Continued*)

Mol B/l soln.	Mol C/l soln.
	$C_8H_8O_3$
3.64	3.44
4.74	3.49
6.49	3.51
8.60	3.23
9.85	3.00
12.00	2.00

C = $C_8H_{14}O_4$
Suberic acid
t = 25° (80)

	$C_8H_{14}O_4$
0.435	0.0388
0.887	0.0451
2.112	0.0670
4.262	0.1446
6.350	0.2159
8.402	0.2923

C = $C_{10}H_7NO_2$
Nitroso-β-naphthol
t = 10° (98)

Wt. % B in (A + B)	g C/kg (A + B)
	$C_{10}H_7NO_2$
0	0.17
1	0.22
2.5	0.23
5	0.31
10	0.64

C = $C_{10}H_8$
Naphthalene (20)
Wt. % soln.

0° B	0° C	25° B	25° C
	$C_{10}H_8$		
71.4	0.482	39.7	0.098
81.1	1.2	47.5	0.195
87	1.92	56.5	0.39
89.9	2.58	60.1	0.486
		68.7	0.967
		74.5	1.57
		79.4	2.42
		80.5	2.69
		83.2	3.59
		84.7	4.81
		86.7	6.07
		86.9	7.3
		86.3	12.3

C = PbO
D = $Pb(C_2H_3O_2)_2.2Pb(OH)_2$
E = $Pb(OH)(C_2H_3O_2)$
F = $Pb(C_2H_3O_2)_2.3H_2O$
t = 25° (112)
Wt. % soln.

B	C
C	
0.20	1.00
0.48	1.07
0.54	1.05
D	
1.03	1.45
2.51	2.89
4.17	3.78
5.61	5.20

C = **PbO**.—(*Continued*)

Wt. % soln.

B	C
D + E	
7.26	7.15
E	
7.79	6.51
7.72	5.59
E + F	
7.92	5.18
F	
7.30	4.38
5.36	3.34
5.49	2.64
13.07	3.16
16.78	3.80
21.53	4.18

C = **$PbCl_2$**

t = 25° (61)

Mol B/l (A + B)	g C/l soln.
$PbCl_2$	
0	10.78
0.050	10.78
0.100	10.88
0.150	10.78
0.200	10.72
0.465	10.26
0.929	9.45
1.845	7.91
3.680	5.27

(59)

Mol B/l (A + B)	Mol C/l soln.
$PbCl_2$	
0	0.03895
1.02	0.03365
2.05	0.02796
3.04	0.02266
3.94	0.01837
5.16	0.01446
5.87	0.01163
7.06	0.00887
7.93	0.00660
8.94	0.00505
10.17	0.00362
11.24	0.00258
12.20	0.00191
13.28	0.00136
14.90	0.00120
Glacial	Tr.

C = **$Pb(C_2H_3O_2)_2$** (100)

Acetate

Mol B/l (A + B)	g C/kg A 25°	25°	45°
$Pb(C_2H_3O_2)_2$			
0.025	541.7	875.5	1540.3
0.05	539.2	873.4	1537.6
0.10	535.1	868.7	
0.110			1533.4

C = **TlCl**

t = 25° (60)

Mol B/l (A + B)	Solution Mol C/l	d_{25}^{25}
TlCl		
0.0	0.01629	
0.513	0.01580	1.0014
1.013	0.01495	1.0043
2.016	0.01325	1.0114
4.180	0.009945	1.0323
8.130	0.005399	1.0550
11.49	0.002594	1.0599
14.31	0.001221	1.0643
16.01	0.000478	1.0667

Mol B/l (A + B)	g C/l soln.
TlCl (61)	
0.0	3.8515
0.0501	3.8375
0.0958	3.8326
0.263	3.7503
0.524	3.6359

C = **$HgC_2H_3O_2$**

Acetate

t = 21° (52); *cf.* (88)

Mol B/l (A + B)	g C/l (A + B)
$HgC_2H_3O_2$	
0	1.024
2	0.730
4	0.690
6	0.650

C = **$AgBrO_3$**

t = 25° (61)

Mol B/l (A + B)	g C/l soln.
$AgBrO_3$	
0.0	1.9493
0.0498	1.9429
0.0997	1.9379
0.1995	1.9206
0.4988	1.8630
0.9975	1.8013
1.8721	1.6178

C = **$AgC_2H_3O_2$**

Acetate

t = 25° (81)

Mol B/l soln.	g C/l soln.
$AgC_2H_3O_2$	
0	11.13
1.00	10.73
2.00	10.32
2.98	9.98
4.19	9.52
4.98	9.19
5.99	8.72
6.80	8.29
8.01	7.73
8.97	7.31
9.96	6.78
11.02	6.15
12.32	5.33
12.97	4.96

C = **$AgC_2H_3O_2$**.—(*Cont'd*)

Mol B/l soln.	g C/l soln.
$AgC_2H_3O_2$	
13.97	4.29
14.96	3.43
15.93	2.48
17.28	1.09

C = **MgO**

D = $Mg(C_2H_3O_2)_2.4H_2O$

E = $3C_2H_4O_2.2Mg(C_2H_3O_2)_2.3H_2O$

F = $10C_2H_4O_2.5Mg(C_2H_3O_2)_2.7H_2O$

t = 25° (68)

Wt. % soln.

B	C
C	
3.36	1.73
5.65	2.93
8.06	4.21
12.46	6.54
C + D	
15.46	8.24
D	
15.38	8.31
14.25	7.24
20.19	7.47
22.93	7.60
26.61	7.74
31.37	7.99
D + E	
36.23	8.18
E	
35.77	8.17
40.87	7.42
47.86	6.74
56.16	5.81
61.59	4.68
65.19	4.36
69.13	3.75
75.93	2.85
82.90	2.23
F	
63.50	3.91
70.09	3.17
75.39	2.87
77.84	2.83
84.05	1.61
86.50	2.19

C = **$Ba(C_2H_3O_2)_2$**

D = $Ba(C_2H_3O_2)_2.3H_2O$

E = $3C_2H_4O_2.3Ba(C_2H_3O_2)_2.11H_2O$

F = $Ba(C_2H_3O_2)_2.2C_2H_4O_2$

t = 25° (68)

B	C
D	
0	5.18
0.41	5.21
1.40	5.34
E	
1.46	5.32
2.42	4.03
3.30	3.48
5.61	3.04
10.23	3.14

C = **$Ba(C_2H_3O_2)_2$**.—(*Cont'd*)

Wt. % soln.

B	C
E	
16.92	3.24
20.60	3.62
26.48	4.41
28.72	4.52
33.14	5.23
36.54	5.60
42.08	7.85
45.28	8.82
46.51	8.87
F	
46.50	9.04
51.98	8.72
58.35	8.62
65.77	8.40
71.34	8.25
77.06	7.79
85.27	7.36

C = **$NaC_2H_3O_2$**

D = $NaC_2H_3O_2.3H_2O$

E = $C_2H_4O_2.NaC_2H_3O_2$

= $NaC_2H_3O_2.2C_2H_4O_2$

t = 20° (1)

Mol % soln.

B	C
D	
0	9.50
1.52	9.54
3.52	9.92
7.50	10.60
D + E	
8.28	10.82
E	
11.74	10.52
16.58	10.40
18.56	10.34
22.86	10.46
28.64	10.50
33.54	10.86
E + F	
33.90	10.84
F	
37.64	10.48
43.36	10.28
52.06	9.78
63.30	9.26
81.30	8.40

t = 25° (57)

Mol B/l soln.	Mol C/l soln.
D	
0	47.75
24.16	47.30

$C_2H_5NO_2$

Glycocoll

C = Salts

t = 20° (145)

Salt	Mol C/l (A + B)	g B/l soln.
	$C_2H_5NO_2$	
Nil...........	0.0	196.3
$MgCl_2$..... ..	0.49	226.0

$C_2H_5NO_2$.—(*Cont'd*)

C = Salts.—(*Continued*)

Salt	Mol C/l (A + B)	g B/l soln. $C_2H_5NO_2$
$CaCl_2$	0.267	214.9
	0.534	234.9
	1.07	273.6
	2.14	350.8
$CaBr_2$	0.51	249.7
$Ca(NO_3)_2$	0.5	255.7
$SrCl_2$	0.25	213.0
	0.5	233.1
	1.0	260.5
	2.0	330.1
$SrBr_2$	0.49	244.1
$Sr(NO_3)_2$	0.5	249.2
$Sr(C_2H_3O_2)_2$	0.5	209.4
$BaCl_2$	0.5	237.5
$Ba(ClO_4)_2$	0.412	254.6
	0.617	271.8
	0.836	294.9
$BaBr_2$	0.5	245.4
$Ba(NO_3)_2$	0.5	248.6
$Ba(C_2H_3O_2)_2$	0.5	210.0
LiCl	0.96	209.4
LiBr	0.97	212.3
NaCl	1.0	205.0
	2.0	209.0
	4.0	213.3
$NaClO_4$	1.0	217.5
NaBr	1.0	206.7
NaI	0.96	209.5
$NaNO_3$	0.5	207.5
	1.0	217.6
	2.0	231.3
	4.0	249.0
Na_2SO_4	0.5	210.0
$NaC_2H_3O_2$	1.0	182.3
KCl	0.5	197.9
	1.0	197.9
	2.0	196.4
	4.0	178.5
KBr	1.0	202.3
KI	1.0	204.4
KNO_3	1.0	206.4
$KC_2H_3O_2$	1.0	176.2
	2.0	156.9
	4.0	122.6
KCNS	0.98	198.9

Salt	g C/l soln. C	Mol B/l (A + B)
$SrCl_2.6H_2O$	471.4	0.00
	475.4	0.25
	478.6	0.50
	484.6	1.00
$BaCl_2.2H_2O$	340.5	0.00
	348.1	0.25
	356.8	0.50
	372.5	1.00
NaCl	326.5	0.00
	314.7	0.25
	313.2	0.50
	309.5	1.00

C = Salts.—(*Continued*)

Salt	g C/l soln. C	Mol B/l (A + B)
KCl	300.8	0.00
	298.9	0.25
	294.2	0.50
	282.9	1.00

C_2H_6O

Ethyl alcohol

C = $C_4H_6O_6$

Tartaric acid

$t = 25°$ (124)

Wt. % B in (A+B)	Wt. % C in soln. $C_4H_6O_6$	d_4^{25} soln.
0.0	57.93	1.321
8.9	56.10	1.304
32.0	51.40	1.246
51.0	46.76	1.181
70.2	39.95	1.091
91.4	27.83	0.963
96.3	24.22	0 929
99.9	21.67	0.906

C = $C_5H_{10}O_5$

α-Xylose

$t = 20°$ (67)

Vol. % B in (A + B)	g C/l soln.
80	27 initial soly.
80	62 final soly.

C = $C_5H_{10}O_5$

α-Lyxose

$t = 20°$ (67)

90	54 initial soly.
90	62 final soly.

C = $C_5H_{10}O_5$

α-Arabinose

$t = 20°$ (67)

80	7.4 initial soly.
80	19.4 final soly.

C = C_6H_6

Benzene

t = solidification temp. of mixture (17)

Mol A/kg satd. soln.	Mol B/kg C C_6H_6
0.07	0.0
0.585	3.57
1.29	5.71
1.88	6.76

Mol B/kg (17) H₂O soln.	Mol B/kg (17) C_6H_6 soln. C_6H_6	Δt
22.81	3.200	2.847
16.79	2.640	2.742
15.39	2.405	2.673
13.02	1.885	2.481
11.22	1.565	2.324

C = C_6H_6.—(*Continued*)

Mol B/kg H_2O soln.	Mol B/kg C_6H_6 soln. C_6H_6	Δt
8.766	1.125	2.035
6.412	0.720	1.654
4.346	0.500	1.359
2.694	0.325	0.983
1.586	0.200	0.685

Δt = freezing-point depression of C.

Wt. % C in soln.	$t°$† (128)
99.5 wt. % B ‡	
92.42	2.95
80.29	1.26
75.32	+0.50
70.92	−0.14
67.05	−0.86
62.05	−1.94
57.85	−2.94
54.16	−4.16
50.15	−5.42
98.0 wt. % B ‡	
95.20	3.50
93.09	3.10
91.92	2.76
86.86	2.22
81.82	1.62
77.15	1.08
69.23	+0.03
65.56	−0.72
58.76	−2.16
53.30	−3.90
50.55	−4.62
48.30	−5.72
95.76 wt. % B ‡	
94.50	3.48
89.60	2.84
81.15	1.86
77.51	+1.48
65.70	−0.12
59.35	−1.04
55.46	−1.92
52.04	−2.75
49.02	−3.62
46.34	−4.42
43.94	−5.34
90.06 wt. % B ‡	
89.18	30.7*
87.55	26.1*
86.88	23.9*
85.24	16.1*
84.30	11.0*
83.18	5.2*
82.54	2.0*
81.19	2.51
74.22	2.13
68.33	1.78
59.42	0.95

C = C_6H_6.—(*Continued*)

Wt. % C in soln.	$t°$†
90.06 wt. % B ‡	
55.60	+0.42
49.31	−0.51
46.62	−0.91
42.09	−1.97
37.65	−3.54
35.76	−4.30
34.05	−5.14
25.18	−2.02
23.76	−2.97
22.50	−3.75
21.36	−4.67
86.0 wt. % B ‡	
73.89	28.3*
72.81	22.7*
71.63	17.6*
70.35	12.9*
68.93	8.5*
67.38	4.5*
80.10 wt. % B ‡	
63.52	39.2*
61.66	32.1*
57.41	19.6*
50.55	9.2*
47.14	5.2*
44.19	1.6*
44.19	2.45
39.24	2.00
33.03	0.96
30.64	+0.30
26.78	−1.12
74.48 wt. % B ‡	
44.43	29.5*
38.23	20.3*
35.12	15.2*
31.02	7.75*
28.90	+3.00*
27.04	−1.25*
27.04	+2.30
24.03	+1.20
18.64	−2.25
17.65	−3.10
15.96	−4.85
69.08 wt. % B ‡	
27.67	25.3*
25.88	21.2*
24.31	17.3*
22.91	13.5*
21.67	9.9*
20.55	6.5*
19.06	1.95*
18.20	2.30
17.15	1.52
15.37	+0.02
13.72	−1.34
12.37	−3.02
11.81	−3.70
57.66 wt. % B ‡	
10.53	15.4*
10.05	12.15*

† The temperature given is that at which benzene crystallizes out, unless marked with a * which indicates the formation of two liquid phases.

‡ % of B in (A+B), solvent.

C = C_6H_6.—(*Continued*)

Wt. % C in soln.	$t°$†
57.66 wt. % B‡	
9.25	7.1*
8.56	+2.3*
8.27	−0.40*
8.27	+2.15
6.66	−2.92
6.34	−4.20
39 wt. % B‡	
<1.0	25.0*
Triple point	
96.76	4.10
82.62	2.55
66.38	2.52
44.95	2.50
28.75	2.64
19.28	2.86
8.70	3.20

† The temperature given is that at which benzene crystallizes out, unless marked with a * which indicates the formation of two liquid phases.
‡ % of B in (A + B), solvent.

C = $C_6H_8O_7$
Citric acid
t = 25° (124)

Wt. % B in (A+B)	Wt. % C in soln.	d_4^{25} soln.
	$C_6H_8O_7$	
32.0	60.6	1.268
51.0	57.1	1.216
70.2	51.9	1.160
81.5	47.9	1.115
91.4	43.0	1.057
99.9	38.4	1.010

C = $C_6H_8O_7.H_2O$
Citric acid
t = 25° (124)

	$C_6H_8O_7.H_2O$	
0 0	67.5	1.311
8.9	66.9	1.302
32.0	65.3	1.270
51.0	63.2	1.236
70.2	60.7*	1.193
81.5	57.6*	1.156
91.4	54.1*	1.121
99.9	49.9*	1.069

* During solution a change in crystalline phase occurs.

C = $C_6H_{12}O_6$
Sugars
t = 20° (67)

Sugar	Vol. % B*	g C/l soln. Init.	Final
		C	
α-Glucose	80	20	45
α-Galactose	60	11	31
	80	2.7	6.5
β-Fructose	80	134	274
	95	18	42
β-Mannose	80	24	130
α-Rhamnose.H_2O	70	82	96
α-Glucose.H_2O	80	13	30
β-Glucose	80	49	91

* In (A + B).

C = $C_6H_{13}N_3.HNO_3$
Galegine nitrate
t = 17° (134)

Vol. % B in (A + B)	g C/kg (A + B)
	$C_6H_{13}N_3.HNO_3$
0	44.8
95	256.4

C = $C_6H_{13}N_3.HCO_3$
Galegine bicarbonate
t = 18° (134)

	$C_6H_{13}N_3.HCO_3$
0	16.7
95	22.7

C = $(C_6H_{13}N_3)_2.H_2SO_4$
Galegine sulfate
t = 19° (134)

	$(C_6H_{13}N_3)_2.H_2SO_4$
0	42.9
60	43.5
80	20.8
95	2.62

C = $C_7H_5N_3O_6$
Trinitrotoluene (135)

g C/kg (A+B)	$t°$
95.07 vol. % B*	
$C_7H_5N_3O_6$	
7.0	0.3
19.9	32.0
29.8	40.1
37.0	45.0
46.1	50.0
60.8	55.0
81.4	59.8
114.0	65.0
185.8	74.0

* Vol. % B in (A + B), solvent.

C = $BiOC_7H_6O_3$
Basic salicylate
t = 25° (124)

Wt. % B in (A + B)	Wt. % C in soln.
	$BiOC_7H_6O_3$
0.0	0.010
20.0	0.015
40.0	0.022
60.0	0.036
80.0	0.065
90.0	0.095
92.3	0.105
100.0	0.160

C = $C_7H_6O_2$
Benzoic acid
t = 25° (124)

Wt. % B in (A + B)	Wt. % C in soln.	d_4^{26} soln.
	$C_7H_6O_2$	
0.0	0.367	1.0000
8.9	0.581	0.9865
32.0	4.667	0.9574
51.0	17.80	0.9464
70.2	30.07	0.9404

C = $C_7H_6O_2$.—(*Continued*)

Wt. % B in (A + B)	Wt. % C in soln.	d_4^{25} soln.
$C_7H_6O_2$		
83.0	35.05	0.9311
96.3	36.51	0.9128
99.8	36.91	0.9093

C = $C_7H_6O_3$
Salicylic acid
t = 25° (124)

$C_7H_6O_3$		
0.0	0.22	1.001
8.9	0.336	0.986
32.0	2.68	0.957
51.0	12.82	0.945
70.2	24.01	0.941
88.0	31.03	0.932
96.3	32.45	0.923
99.8	33.20	0.919

C = $C_7H_6O_6.H_2O$
Gallic acid
t = 25° (124)

$C_7H_6O_5.H_2O$		
0.0	1.15	1.002
17.0	3.31	0.985
41.7	11.16	0.974
70.2	18.01	0.946
89.6	21.17	0.919
99.9	22.14	0.902

C = $(NH_4)C_7H_5O_2$
Benzoate
t = 25° (124)

$(NH_4)C_7H_6O_2$		
0.0	18.6	1.043
8.9	18.0	1.029
32.0	18.1	0.993
51.0	16.9	0.954
70.2	12.1	0.900
91.4	3.8	0.825
96.3	2.5	0.808
99.9	1.6	0.796

C = $(NH_4)C_7H_6O_3$
Salicylate
t = 25° (124)

$(NH_4)C_7H_5O_3$		
0.0	50.8	1.148
8.9	50.8	1.137
32.0	49.3	1.104
70.2	42.0	1.014
88.0	33.1	0.946
91.4	30.5	0.932
96.3	26.5	0.901
99.8	22.3	0.875

C = $C_7H_{14}O_7$
β, α-Glucoheptose
t = 20° (67)

Vol. % B in (A + B)	g C/l soln. Init.	Final
	$C_7H_{14}O_7$	
20	40	45

C = $C_9H_{10}ClNO$
2, 4-Acetylchlorotoluidine
t = room (142)

Vol. % B* in (A + B)	g C/kg (A + B)
	$C_9H_{10}ClNO$
33.3	2.6
50	19.6
100	62.7

C = $C_9H_{10}ClNO$
2, 5-Acetylchlorotoluidine
t = room (142)

	$C_9H_{10}ClNO$
33.3	4.8
50	83.0
100	62.0

* B as here used was 96 % ethyl alcohol.

C = $C_{10}H_8$
Naphthalene (20)
Wt. % soln.

t = 0° B	C	t = 25° B	C
	$C_{10}H_8$		
51.4	0.235	29.7	0.04
74.3	1.183	34.1	0.108
88.6	2.89	39.1	0.167
93.6	4.08	41.4	0.225
		47.4	0.446
		58.2	1.14
		63.8	1.62
		72.9	2.83
		79.5	4.42
		88.6	9.5

C = $C_{10}H_{16}O_4$
Camphoric acid
t = 25° (124)

Wt. % B in (A+B)	Wt. % C in soln.	d_4^{25} soln.
$C_{10}H_{16}O_4$		
0.0	0.754	1.0
8.9	1.24	1.0
32.0	16.29	1.0
51.0	38.61	1.0
70.2	48.95	1.0
83.0	51.46	0.985
91.4	51.13	0.980
96.3	50.37	0.970
99.8	50.13	0.960

C = $C_{12}H_{22}O_{11}$
Sugars
t = 20° (67)

Sugar	Vol. % B*	g C/l soln. Init.	Final
		C	
Sucrose	80	37	37
β-Cellose	20	32	47
α-Lactose.H_2O	40	11	24
β-Maltose.H_2O	60	30	47.5
β-Melibiose.$2H_2O$	80	7.6	13
Trehalose.$2H_2O$	70	18	18

* In (A + B).

C_2H_6O.—(*Continued*)

C = $C_{12}H_{22}O_{11}$
Sucrose
t = 14° (113)
g/100 cm³ soln.

A	B	C
	$C_{12}H_{22}O_{11}$	
45.10	0	87.5
43.83	8.52	74.5
38.02	28.13	47.1
29.57	46.28	18.8
12.83	71.18	0.9
3.28	77.39	0.36

C = $C_{13}H_{10}O_3$
Phenyl salicylate
t = 25° (124)

Wt. % B in (A+B)	Wt. % C in soln.	d_4^{25} soln.
$C_{13}H_{10}O_3$		
0.0	0.015	0.999
8.9	0.018	0.985
32.0	0.067	0.950
51.0	0.861	0.912
70.2	4.44	0.877
88.0	11.91	0.863
96.3	26.68	0.878
99.8	34.73	0.897

C = $C_{16}H_{11}NO_2$
Phenylcinchoninic acid
t = room (87)

Vol. % B in (A + B)	g C/kg soln.
$C_{16}H_{11}NO_2$	
0	0.16
95	8.31

C = $C_{16}H_{32}O_2$
Palmitic acid (35)

$t°$	g C/l (A + B)
$C_{16}H_{32}O_2$	
50 wt. % B*	
10	0.5
23	0.9
30	1.2
41	3.1
75 wt. % B*	
10	2.4
20	4.3
30	11.9
40	35.9

* % B in (A + B), solvent.

C = $(NH_4)C_{16}H_{31}O_2$
Palmitate (35)

$(NH_4)C_{16}H_{31}O_2$	
50 wt. % B*	
23	53.3
41	66.92
75 wt. % B*	
10	17.8
20	43.3
30	110.2
40	148.4

* % B in (A + B), solvent.

C = $C_{18}H_{32}O_{16}$
Raffinose
t = 20° (67)

Vol. % B in (A + B)	g C/l soln.
$C_{18}H_{32}O_{16}.5H_2O$	
50	14*

* Initial and final solubility.

C = $C_{18}H_{36}O_2$
Stearic acid (35)

$t°$	g C/l solvent
$C_{18}H_{36}O_2$	
50 wt. % B*	
23	0.8
30	1.0
41	1.2
75 wt. % B*	
10	1.5
30	3.9
40	7.7

t = 25° (124)

Wt. % B in (A+B)	Wt. % C in soln.	d_4^{25} soln.
$C_{18}H_{36}O_2$		
0.0	0.034	0.999
17.0	0.035	0.972
41.7	0.121	0.929
70.2	0.813	0.864
89.6	3.163	0.817
96.4	6.442	0.803
99.9	8.277	0.795

* % B in (A + B), solvent.

C = $(NH_4)C_{18}H_{33}O_2$
Oleate (35)

$t°$	Wt. % B in (A+B)	g C/l (A + B)
$(NH_4)C_{18}H_{33}O_2$		
20	75	82.0
30	75	108.6

C = $(NH_4)C_{18}H_{35}O_2$
Stearate (35)

$t°$	g C/l (A + B)
$(NH_4)C_{18}H_{35}O_2$	
50 wt. % B*	
12	2.5
23	5.1
30	11.6
41	32.1
75 wt. % B*	
10	5.6
30	18.3
40	50

* % B in (A + B), solvent.

C = $C_{19}H_{22}N_2O$
Cinchonine
t = 20° (114)

Vol. % B in (A + B)	g C/ kg (A+B)
$C_{19}H_{22}N_2O$	
0	1.30
100*	8.62

* d_{25}^{25} = 0.832.

C = $C_{21}H_{22}N_2O_2$
Strychnine
t = 20° (114)

Vol. % B in (A + B)	g C/kg (A + B)
$C_{21}H_{22}N_2O_2$	
0	0.39
100*	8.33

* d_{25}^{25} = 0.832.

C = $C_{21}H_{22}N_2O_2.HNO_3$
Strychnine nitrate

$t°$	g C/kg (A + B)
90 vol. % B*	
15	9.23
B.P. of B	41.7

* Vol. % B in (A + B), solvent.

C = $C_{27}H_{30}N_2O_5.\frac{1}{2}H_2O$
Quinine salicylate
t = 25° (124)

Wt. % B in (A+B)	Wt. % C in soln.	d_4^{25} soln.
$C_{27}H_{30}N_2O_5.\frac{1}{2}H_2O$		
0.0	53.56	1.252
8.9	52.10	
32.4	47.40	1.169
51.6	41.93	1.102
71.5	32.10	1.010
92.6	11.75	0.864
96.6	6.56	0.828
99.9	3.82	0.805

C = $PbCl_2$
t = 25° (76)

Mol B/l (A + B)	Mol C/l soln.
$PbCl_2$	
4	0.0172
2	0.0257
1	0.0298
0.5	0.0330
0.25	0.0338
0.125	0.0367
0	0.0388

C = $Pb(C_2H_3O_2)_2$
Acetate
t = 25° (124)

Wt. % B in (A+B)	Wt. % C in soln.	d_4^{25} soln.
$Pb(C_2H_3O_2)_2.3H_2O$		
0.0	42.61	1.343
8.9	38.41	1.285
32.0	28.45	1.150
51.0	21.49	1.052
70.2	14.42	0.952
$Pb(C_2H_3O_2)_2$		
81.5	9.42	0.902
89.6	1.80	0.827
91.4	1.27	0.821
96.2	0.46	0.802
99.9	0.40	0.791

C = $Ga(NH_4)(SO_4)_2.12H_2O$
t = 25° (29)

Vol. % B in (A + B)	g C/l soln.
$Ga(NH_4)(SO_4)_2.12H_2O$	
0	308.4
50	0.217
70	0.0875

C = $Zn(C_2H_3O_2)_2$
Acetate
t = 25° (124)

Wt. % B in (A+B)	Wt. % C in soln.	d_4^{25} soln.
$Zn(C_2H_3O_2)_2.2H_2O$		
0.0	30.78	1.168
8.9	27.64	1.132
32.0	19.78	1.048
70.2	7.90	0.878
91.4	4.16	0.832
$Zn(C_2H_3O_2)_2$		
96.3	3.87	0.822
99.9	1.18	0.796

C = $Zn(C_5H_9O_2)_2$
Valerate
t = 25° (124)

$Zn(C_5H_9O_2)_2$		
0.0	1.437	1.004
17.0	0.900	0.976
26.4	0.723	0.961
41.7	0.809	0.933
51.0	0.998	0.914
81.5	1.841	0.844
89.6	3.143	0.827
91.4	4.397	0.826
93.6	7.148	0.830
96.3	10.53	0.835
99.9	15.61	0.844

C = $Zn(C_6H_5SO_4)_2.8H_2O$
p-Phenolsulfonate
t = 25° (124)

$Zn(C_6H_5SO_4)_2.8H_2O$		
0.0	39.81	1.185
8.9	40.11	1.174
17.0	40.53	1.165
26.4	41.24	1.155
51.0	42.12	1.124
70.2	40.85	1.080
89.6	41.34	1.047
99.9	48.77	1.075

C = Ag_2O (78.1)

C = Ag_2CrO_4 (48)

C = $[(CH_3)_2NH]_2H_2PtCl_6$
t = 0° (11)

Vol. % B in (A + B)	g C/kg (A + B)
$[(CH_3)_2NH]_2H_2PtCl_6$	
90	1.10
80	3.25
70	5.58
60	9.96

C = $[(CH_3)_3N]_2H_2PtCl_6$

$t = 0°$ (11)

Vol. % B in (A + B)	g C/kg (A + B)
$[(CH_3)_3N]_2H_2PtCl_6$	
90	0.70
80	2.43
70	3.91
60	7.66

C = $MnSO_4$ (121)

See also Vol. III, Table 3, p. 404

$t°$	Wt. % soln. H_2O layer B	H_2O layer C	C_2H_6O layer B	C_2H_6O layer C
	$MnSO_4.5H_2O$			
10	13.78	25.25	37.06	5.44
15	9.25	29.79	44.56	2.79
17.6	8.53	30.88	47.11	2.22
21	6.10	35.05	53.55	1.10
25	6.81	33.72	53.09	1.23
	$MnSO_4.H_2O$			
30	8.69	30.15	45.20	2.49
31	8.47	30.10	43.90	2.74
35	9.24	28.61	41.71	3.44
37	11.03	26.47	38.26	4.84
41	11.93	24.97	34.01	5.86
42	13.57	23.09	32.37	6.89
43	14.33	22.01	31.42	8.51

Wt. % soln. B	C
$t = 25°$	
$MnSO_4.5H_2O$	
0	39.3
Two satd. conjugate phases	
6.81	33.72
53.09	1.23
$MnSO_4.5H_2O$	
57.39	0.56
$MnSO_4.H_2O$	
76.70	0.0
$t = 30°$	
$MnSO_4.5H_2O$	
0	38.60
2.26	36.31
5.09	33.66
5.96	33.26
Two satd. conjugate phases	
8.69	30.15
45.20	2.49
$MnSO_4.5H_2O$	
54.19	0.98
68.97	0.08
90.80	0.01
$t = 35°$	
$MnSO_4.5H_2O$	
0	38.60
5.50	32.37
6.46	31.48
7.48	30.51
Two satd. conjugate phases	
9.24	28.61
41.71	3.44
$MnSO_4.5H_2O$	
47.73	1.58
48.27	1.57

C = $MnSO_4$.—(*Continued*)

Wt. % soln. B	C
$t = 50°$	
$MnSO_4.5H_2O$	
0	36.26
6.67	28.12
16.02	18.75
22.63	12.54
36.47	4.12

C = CaS_2O_6

$t = 30°$ (6)

$CaS_2O_6.4H_2O$	
0	23.29
16.50	12.55
40.39	3.31
50.96	1.39
73.08	0.11
82.79	0.063
92.47	0.059
99.80	0.00

C = $Ca(NO_3)_2$

$t = 25°$ (26)

$Ca(NO_3)_2.4H_2O$	
0	57.5
3.5	56.1
8.1	55.2
14.1	52.9
22.3	50.2
29.4	49.0
31.1	49.7
31.2	52.0
29.5	56.2
28.3	58.9
27.8	60.0
27.3	60.7
$Ca(NO_3)_2 + Ca(NO_3)_2.4H_2O$	
26.5	62.3
$Ca(NO_3)_2$	
27.4	62.0
28.5	61.2
$Ca(NO_3)_2 + Ca(NO_3)_2.2C_2H_6O$	
29.9	60.3
$Ca(NO_3)_2.2C_2H_6O$	
35.8	55.3
42.5	51.0
54.6	41.9
60.2	38.6
Metastable systems	
$Ca(NO_3)_2$	
0	82.5
5.8	77.0
15.2	69.5
20.4	66.1
22.4	64.9
35.9	57.7
48.1	51.4

C = CaC_2O_4, Oxalate (48)

C = SrS_2O_6

$t = 30°$ (6)

$SrS_2O_6.4H_2O$	
0	14.90
14.48	5.40

C = SrS_2O_6.—(*Continued*)

Wt. % soln. B	C
$SrS_2O_6.4H_2O$	
37.22	0.68
60.39	0.08
76.13	0.0012
90.05	0.00
98.53	0.00

C = $Sr(NO_3)_2$

$t = 25°$ (26)

$Sr(NO_3)_2.4H_2O$	
0	44.3
1.7	42.8
2.6	42.1
4.95	40.4
7.95	37.6
11.75	34.7
$Sr(NO_3)_2 + Sr(NO_3)_2.4H_2O$	
12.4	34.3
$Sr(NO_3)_2$	
13.8	33.2
32.4	20.5
53.6	10.5
77.2	2.60
99.4	0.02
Metastable systems	
$Sr(NO_3)_2$	
0	46.6
3.45	42.7
6.0	40.1
9.5	36.7
10.45	35.7

C = $Sr(C_7H_5O_3)_2.2H_2O$

Salicylate

$t = 25°$ (124)

Wt. % B in (A+B)	Wt. % C in soln.	d_4^{25} soln.
$Sr(C_7H_5O_3)_2.2H_2O$		
0.0	5.04	1.022
8.9	4.91	1.007
32.4	6.55	0.979
51.6	8.02	0.945
71.5	5.80	0.891
96.6	1.24	0.804
99.9	0.44	0.790

C = $BaCl_2$ (119)

Wt. % soln. B	C
$t = 30°$	
$BaCl_2.2H_2O$	
0	27.95
32.7	10.63
50.2	5.68
66.72	2.23
$BaCl_2.2H_2O + BaCl_2.H_2O$	
94.7	0.06
$BaCl_2.H_2O$	
97.14	
98.17	0.08
$BaCl_2$	
99.41	

C = $BaCl_2$.—(*Continued*)

Wt. % soln. B	C
$t = 60°$	
$BaCl_2.2H_2O$	
0	31.57
16.68	20.16
34.1	13.21

C = BaS_2O_6

$t = 30°$ (6)

$BaS_2O_6.2H_2O$	
0	19.86
4.67	12.74
16.86	4.24
21.36	2.74
31.91	0.86
42.53	0.37
61.24	0.03
76.61	0.01
87.00	0.009
88.69	0.00
98.81	0.00

C = $Ba(NO_3)_2$

$t = 25°$ (26)

$Ba(NO_3)_2$	
0	9.55
9.5	7.63
17.5	6.02
23.7	5.25
38.8	3.53
57.0	1.85
78.2	0.62
89.9	0.18
99.4	0.005

C = $Ba(C_2H_3O_2)_2$

Acetate (25)

C = $Ba(C_3H_5O_2)_2$

Propionate (25)

C = $Ba(C_4H_7O_2)_2$

Butyrate (25)

C = $Ba(C_6H_2N_3O_7)_2$

Picrate

$t = 25°$ (38)

Vol. % B in (A + B)	g C/l soln.
$Ba(C_6H_2N_3O_7)_2.5H_2O$	
0	12.60
10	10.37
15	8.89
20	9.63
30	14.82
$Ba(C_6H_2N_3O_7)_2.4H_2O$	
40	21.49
45	12–23
50	31.87
60	34.83
65	34.83
70	33.35
80	31.87
85	31.87
95	29.64
100	53.36

C_2H_6O.—(Continued)

C = $Ba(C_7H_3N_2O_7)_2$
Dinitrosalicylate
t = 25° (38)

Vol. % B in (A + B)	g C/l soln.
$Ba(C_7H_3N_2O_7)_2$	
0	6.30
10	5.24
20	4.38
30	5.70
40	7.94
50	11.24
60	9.45
70	9.15
80	8.94
90	3.20
100	3.82

C = $BaCrO_4$
t = room (48)

C = LiCl
t = 25° (104)
Wt. % in (A + B)

B	C
LiCl	
0	81.49
10.38	73.97
18.50	67.24
29.82	60.58
35.01	57.91
40.26	53.13
45.10	49.84
54.87	42.90
66.64	35.24
71.86	33.24
75.90	30.51
80.96	28.33
90.10	27.33
100	26.18

C = Li_3SbS_4
t = 30° (119)
Wt. % in soln.

B	C
$Li_3SbS_4.8\frac{1}{2}H_2O$	
0	50.8
13.3	46.3
51.9	30.7
54.8	29.9
58.4	30.8
$Li_3SbS_4 + Li_3SbS_4.8\frac{1}{2}H_2O$	
58.6	32.3
Li_3SbS_4	
65.3	29.3
74.3	24.1
79.5	20.5

C = $Li_3(C_6H_5O_7).4H_2O$
Citrate
t = 25° (124)

Wt. % B in (A+B)	Wt. % C in soln.	d_4^{25} soln.
$Li_3(C_6H_5O_7).4H_2O$		
0.0	42.70	1.2160
8.9	33.50	1.1570
17.0	29.00	1.1150

C = $Li_3(C_6H_5O_7).4H_2O$.—(Continued)

Wt. % B in (A+B)	Wt. % C in soln.	d_4^{25} soln.
$Li_3(C_6H_5O_7).4H_2O$		
26.4	18.50	1.0430
41.7	7.90	0.9692
51.0	4.40	0.9296
70.2	0.54	0.8674
89.6	0.06	0.8166
99.9	0.02	0.7883

C = $Li(C_7H_5O_2)$
Benzoate
t = 25° (124)

$Li(C_7H_5O_2)$		
0.0	27.64	1.103
8.9	28.52	1.090
32.0	27.79	1.047
51.0	23.46	0.999
70.2	15.23	0.931
91.4	5.98	0.838
96.2	4.02	0.815
99.9	2.61	0.799

C = $Li(C_7H_5O_3).\frac{1}{2}H_2O$
Salicylate
t = 25° (124)

$Li(C_7H_5O_3).\frac{1}{2}H_2O$		
0.0	56.0	1.209
8.9	55.9	
32.4	54.2	1.159
51.6	52.0	1.120
71.5	49.2	1.060
92.6	45.4	1.021
96.6	45.6	1.018
99.9	48.2	1.027

C = NaCl
t = 0° (5)

Mol B/kg A	g C/kg A
NaCl	
0	359.65
0.25	355.15
0.50	349.65
1.0	337.80
3.0	301.60

t = 25° (4)

NaCl	
0	361.4
0.25	356.3
0.50	352.2
1.0	344.2
2.0	331.5
5.0	295.3

t = 30° (21); *cf.* (40)
Wt. % soln.

B	C
NaCl	
0	26.5
6.3	23.5
7.7	22.6
13.4	20.5
21.4	17.7

C = NaCl.—(Continued)
Wt. % soln.

B	C
NaCl	
25.3	15.7
29.2	15.0
40.8	11.2
45.3	9.3
50	8.4
56.2	6.4
61.9	4.8
67.4	3.7
73.4	2.9
78.7	1.6
87.2	0.9
90.0	0.4
99.9	0.1

C = $NaClO_4$ (19)

$t°$	Wt. % B in (A+B)	g C/l soln.
	$NaClO_4$	
20	90	16.1
	75	110.8
	50	311.3
40	90	22.9
	75	133.5
	50	321.8
60	90	29.0
	75	155.8
	50	326.8
70	75	161.3

C = NaBr
t = 30° (21)
Wt. % soln.

B	C
$NaBr.2H_2O$	
0	59.4
11.79	42.90
31.78	32.12
43.22	26.79
54.59	20.83
65.51	16.08
72.36	13.41
$NaBr.2H_2O$ + NaBr	
76.92	12.03
NaBr	
87.35	7.44
97.08	3.01

C = NaI
t = 30° (21)

$NaI.2H_2O$	
0	65.52
3.40	64
18.5	54.2
18.8	54
28.5	48.8
41.7	42.35
53.2	38.5
54.7	37.91
$NaI.2H_2O$ + NaI	
55.37	37.49
NaI	
59.24	35.65
61.78	33.24
68.70	30.90

C = Na_2SO_4
t = 25° (118)
Wt. % soln.

B	C
$Na_2SO_4.10H_2O$	
0	21.9
9.3	12.2
22.9	4.3
34.84	1.75
50.5	0.5
$Na_2SO_4.10H_2O + Na_2SO_4$	
53.0	0.4
54.0	0.4
Na_2SO_4	
64.95	0.15

Wt. % B in (A + B)	g C/kg (A + B)
(16)	
$Na_2SO_4.10H_2O$	
t = 15°	
0.0	127
9.2	67
19.4	26
39.7	5
58.9	1
72	0.4
t = 25°	
0.0	282
10.6	139
24.0	45
54	4
$Na_2SO_4.7H_2O$	
t = 15°	
0.0	374
11.2	163
20.6	70
30.2	20
Na_2SO_4	
t = 36°	
0.0	493
8.8	292
12.8	224
17.9	154
18.1	153
28.9	54
48.7	8
t = 45°	
0.0	479
9.0	275
14.5	192
20.6	123
31.0	51

Solutions in equilibrium with Na_2SO_4 and $Na_2SO_4.10H_2O$

$t°$	A	B	C
	Wt. % soln.		
32.5	66.7	0	33.3
31	71	9	20
30.5	71	18	11
30.3	66	29	5
30	64.5	32	3.5
25	46	54	0.4
20	35	65	0.1
15	28	72	0.0
10	24	76	0.0

C = $NaNO_3$

t = 25° (5)

Mol B/kg A	g C/kg A
$NaNO_3$	
0	920.3
0.25	908[illegible]
0.50	896.6
1.0	871.0
2.0	825.4

C = $Na_2Sb_2O_6.6H_2O$ (139)

Solvent Vol. % B	Solvent d_{15}^{15}	g C/l soln. 18°	g C/l soln. 25°	g C/l soln. 33.5°
$Na_2Sb_2O_6.6H_2O$				
0		0.564	0.738	1.018
20	0.9774	0.118	0.150	0.403
33.33	0.9618	0.038	0.060	0.140
50	0.9370	0.001	0.004	0.008

C = Na_2CO_3

t = 30° (21)

Wt. % soln.

B	C
$Na_2CO_3.10H_2O$	
0	27.40
2.64	26.61
3.41	26.14
44.8	1.38
53.0	0.62
53.3	0.61
$Na_2CO_3.10H_2O + Na_2CO_3.7H_2O$	
55.7	0.53
$Na_2CO_3.7H_2O$	
56.6	0.51
62.6	0.47
63.2	0.40
72.8	0.15
$Na_2CO_3.7H_2O + Na_2CO_3.H_2O$	
73.1	0.11
$Na_2CO_3.H_2O$	
80.0	0.07
86.8	0.06
93.1	0.04
95.1	0.03
Na_2CO_3	
95.7	*
98.5	*

* Solubility negligible.

C = $NaC_2H_3O_2$

Acetate

t = 25° (124)

Wt. % B in (A+B)	Wt. % C in soln.	d_4^{25} soln.
$NaC_2H_3O_2$		
0.0	55.75	1.209
8.9	53.22	1.162
32.0	45.59	1.104
51.0	36.44	1.034
70.2	22.18	0.941
81.4	11.74	0.876
91.4	6.28	0.834
99.9	7.31	0.823

C = $Na_3C_6H_5O_7.5\frac{1}{2}H_2O$

Citrate

t = 25° (124)

C = $Na_3C_6H_5O_7.5\frac{1}{2}H_2O$.—(*Continued*)

Wt. % B in (A+B)	Wt. % C in soln.	d_4^{25} soln.
$Na_3C_6H_5O_7.5\frac{1}{2}H_2O$		
0.0	48.10	1.2760
8.9	38.90	
17.0	29.30	1.1290
26.4	15.70	1.0370
41.7	3.70	0.9473
51.0	1.35	0.9166
70.2	0.09	0.8654
99.9		0.7894

C = $NaC_6H_5SO_4.2H_2O$

p-Phenolsulfonate

t = 25° (124)

Wt. % B in (A+B)	Wt. % C in soln.	d_4^{25} soln.
$NaC_6H_5SO_4.2H_2O$		
0.0	19.38	1.079
8.9	17.46	1.057
17.0	15.98	1.038
26.4	14.47	1.016
51.0	9.5	0.952
70.2	5.03	0.886
89.6	1.16	0.821
99.9	1.49*	

* C became opaque.

C = $NaC_6H_4NO_3$

p-Nitrophenate

t = 25° (38)

Vol. % B in (A + B)	g C/l soln.
$NaC_6H_4NO_3.4H_2O$	
0	56.35
10	51.50
15	50.07
30	51.84
40	53.44
45	52.97
$NaC_6H_4NO_3.2H_2O$	
0	56.40
10	51.68
15	50.19
20	50.07
25	50.88
30	51.56
35	52.81
40	53.44
45	53.13
50	52.00
60	47.49
65	43.78
70	38.95
80	27.53
85	20.45
90	14.95
95	12.56
100	44.12

C = $NaC_6H_3NClO_3$

2-Nitro-4-chlorophenate

t = 25° (38)

C = $NaC_6H_3NClO_3$.—(*Cont'd*)

Vol. % B in (A + B)	g C/l soln.
$NaC_6H_3NClO_3.H_2O$	
0	27.02
10	23.74
20	23.14
25	24.04
30	25.76
35	27.08
40	29.90
45	31.90
50	30.68
55	27.24–29.08
60	31.46
65	31.10
70	26.04
80	18.60
90	8.70
95	6.16
100	6.80

C = $NaC_6H_3N_2O_5.H_2O$

2, 4-Dinitrophenate

t = 25° (38)

$NaC_6H_3N_2O_5.H_2O$	
0	44.61
10	35.16
15	32.46
20	31.88
25	30.90
30	31.48
35	32.60
40	33.86
50	34.70
55	33.92
60	32.14
70	26.30
75	21.74
80	17.98
85	12.58
90	8.18
95	5.66
100	26.71

C = $NaC_6H_2N_3O_7$

Picrate (38)

C = $NaC_6H_2N_3O_7$.—(*Cont'd*)

Vol. % B in (A + B)	g C/l soln.
$NaC_6H_2N_3O_7.H_2O$	
t = 0°	
0	18.24
5	14.26
10	11.69
15	9.64
20	8.16
25	7.21
30	7.18
35	7.55
40	8.43
45	10.42
50	11.25
55	12.93
60	12.77
80	8.84
90	5.47
95	4.493
100	2.683
t = 25°	
0	42.80
5	37.41
10	33.26
20	28.16
25	27.44
30	27.89
35	29.94
40	31.45
45	33.13
50	34.09
60	32.45
65	30.47
70	27.77
80	19.48
85	15.37
90	12.47
95	8.73
100	44.38

C = $NaC_7H_5O_2$

Benzoate

t = 25° (124)

Wt. % B in (A+B)	Wt. % C in soln.	d_4^{25} soln.
$NaC_7H_5O_2$		
0.0	35.99	1.155
8.9	35.53	1.137
32.0	31.74	1.082
51.0	25.43	1.016
70.2	15.25	0.927
91.4	2.25	0.825
96.3	1.05	0.807
99.9	0.58	0.795

C = $NaC_7H_5O_3$

Salicylate

t = 25° (124)

$NaC_7H_5O_3$		
0.0	53.56	1.252
8.9	52.10	
32.4	47.40	1.169
51.6	41.93	1.102
71.5	32.10	1.010
92.6	11.75	0.864
96.6	6.56	0.828
99.9	3.82	0.805

C = $Na_3C_9H_5S_2O_8$

Disulfocinnamate (86)

t°	Vol. % B in (A+B)	Wt. % C in soln.
$Na_3C_9H_5S_2O_8$		
Room	40	6
B. P.	40	23

C = KF

t = 23–25° (44)

Wt. % B in (A + B)	g C/kg (A + B)
KF	
99.6	47.9
KF + $KF.2H_2O$	
97.5	15.41
$KF.2H_2O$	
84	11.7

C = KCl

Mol B/kg A	g C/kg A
KCl	
t = 0° (5)	
0	285.2
0.25	278.0

C_2H_6O.—(*Continued*)

C = KCl.—(*Continued*)

Mol B/kg A	g C/kg A
	KCl
t = 0° (5)	
0.50	271.1
1.0	256.5
3.0	208.8
t = 25° (4)	
0	359.7
0.25	353.8
0.50	346.2
1.0	333.8
2.0	315.6
5.0	258.9

C = $KClO_4$

t = 14° (103)

Vol. % B in (A + B)	g C/l soln.
	$KClO_4$
94.7	0.15
58.5	2.6
42.4	3.9
27.3	5.7
13.2	7.8
7.1	9.2
0	12.4

t = 25.00° (39)

Vol. % B in (A + B)	g C/kg (A + B)
	$KClO_4$
50	7.90
75	3.13

t = 25.2° (136)

Vol. % B in (A + B)	g C/kg soln.
	$KClO_4$
0	20.85
51.2	7.54
93.5	0.51
98.8	0.19

t = 40.00° (39)

Vol. % B in (A + B)	g C/kg (A + B)
	$KClO_4$
50	14.22
75	5.48

C = KBr

Mol B/kg A	g C/kg A
	KBr
t = 0° (5)	
0.0	536.8
0.25	529.3
0.50	502.9
1.0	491.8
3.0	455.3
t = 25° (4)	
0.0	688.4
0.25	683.9
0.50	669.3
1.0	652.2
3.0	591.3
5.0	549.9

C = KI

t = 25° (4)

Mol B/kg A	g C/kg A
	KI
0.0	1487.9
0.25	1481.4
0.50	1471.0
1.0	1449.3
3.0	1383.7
5.0	1337.1

C = K_2SO_4

t = 25° (5)

	K_2SO_4
0	122.5
1.0	86.75

t = 25° (42)

Wt. % soln.

B	C
	K_2SO_4
1.35	9.17
4.80	6.90
7.80	4.96
9.70	4.32
12.34	3.57
14.51	2.71
15.26	2.66
20.50	1.83
26.91	0.97
35.97	0.41
43.90	0.22
69.26	0.016

C = KNO_3

t = 25° (5)

Mol B/kg A	g C/kg A
	KNO_3
0	384.5
0.25	368.3
0.50	354.4
1.0	327.0

C = K_2CO_3

t = 23–25° (44)

Wt. % B in (A + B)	g C/kg (A + B)
	K_2CO_3
99.6	16.3
	$2K_2CO_3.3H_2O$
97.5	0.54

C = $KC_2H_3O_2$

Acetate

t = 25° (124)

Wt. % B in (A+B)	Wt. % C in soln.	d_4^{25} soln.
	$KC_2H_3O_2$	
0.0	68.73	1.417
32.0	67.74	1.336
51.0	62.50	1.255
70.2	55.30	1.154
89.6	35.70	0.997
96.2	22.90	0.909
99.9	14.50	0.857

C = $K_2C_4H_4O_6.\frac{1}{2}H_2O$

Tartrate

t = 18° (101)

Vol. % B in (A + B)	g C/l soln.
	$K_2C_4H_4O_6.\frac{1}{2}H_2O$
0	4.903
50	3.582
80	2.935
100	2.566

C = $KHC_4H_4O_6$

Bitartrate

t = 14° (103)

	$KHC_4H_4O_6$
94.7	0.05
58.5	0.2
42.4	0.42
27.3	0.77
15.9	1.5
8.7	2.2
0	4.8

t = 25° (124)

Wt. % B in (A+B)	Wt. % C in soln.	d_4^{25} soln.
	$KHC_4H_4O_6$	
0.0	0.649	1.002
8.9	0.382	0.986
17.0	0.242	0.975
26.4	0.157	0.961
51.0	0.062	0.911
89.6	0.018	0.816
99.9	0.010	0.789

C = $KSbOC_4H_4O_6.\frac{1}{2}H_2O$

Tartar emetic

t = 25° (124)

	$KSbOC_4H_4O_6.\frac{1}{2}H_2O$	
0	7.85	1.052
8.9	4.20	1.011
17.0	2.49	0.988
26.4	1.16	0.966
51.0	0.22	0.911
70.2	0.06	0.865
89.6	Tr.	0.816
99.9	Tr.	0.788

C = $K_3C_6H_5O_7.H_2O$

Citrate

t = 25° (124)

	$K_3C_6H_5O_7.H_2O$	
0	64.50	1.5180
	Upper layer	
32.0	0.2	
51.0	0.38	
70.2	0.10	0.8366
	Lower layer	
8.9	60.00	1.4920
32.0	61.60	1.4930
51.0	62.50	
70.2	62.30	
	One liquid phase	
81.4	0.038	0.8356
91.6	0.016	0.8139
99.9	0.014	0.7896

C = $KC_6H_2N_3O_7$

Picrate

t = 25° (38)

Vol. % B in (A + B)	g C/l soln.
	$KC_6H_2N_3O_7$
0	6.45
10	5.59
15	4.75
20	4.50
25	4.53
30	4.72
35	4.84
40	5.33
45	5.60
50	5.82
55	5.98
60	5.74
65	5.46
70	4.85
75	4.10
80	3.26
85	2.27
90	1.74
95	1.00
100	1.84?

C = K_2SiF_6

t = 14° (103)

	K_2SiF_6
94.7	0.0096
42.4	0.05
27.3	0.09
15.9	0.21
8.7	0.46
0	0.9

C = K_2PtCl_6

t = 14° (103)

	K_2PtCl_6
94.7	0.05
58.5	0.2
42.4	0.5
27.3	1.4
15.9	2.6
8.7	4.2
0	9.3

C = $K_3Co(NO_2)_6.1\frac{1}{2}H_2O$

t = 14° (103)

	$K_3Co(NO_2)_6.1\frac{1}{2}H_2O$
94.7	0.026
42.4	0.033
27.3	0.036
15.9	0.056
8.7	0.09
0	0.21

C = $KNaC_4H_4O_6$

Tartrate

t = 25° (124)

Wt. % B in (A+B)	Wt. % C in soln.	d_4^{25} soln.
	$KNaC_4H_4O_6$	
0.0	53.33	1.310
8.9	43.26	1.229
17.0	31.49	1.152
26.4	17.63	1.065

C = $KNaC_4H_4O_6$.—(*Cont'd*)

Wt. % B in (A+B)	Wt. % C in soln.	d_4^{25} soln.
$KNaC_4H_4O_6$		
41.7	5.09	0.955
51.0	2.20	0.922
81.5	0.04	0.838
99.9	Tr.	0.789

C = $RbClO_4$ (39)

Vol. % B in (A+B)	g C/kg (A + B) 25°	40°
$RbClO_4$		
50	5.20	9.54
75	2.04	3.70

C = $CsClO_4$ (39)

	25°	40°
$CsClO_4$		
50	8.79	15.22
75	3.65	6.35

C = $CsGa(SO_4)_2.12H_2O$

t = 25° (29)

Vol. % B in (A + B)	g C/l soln.
$CsGa(SO_4)_2.12H_2O$	
0	15.1
50	0.0387
70	0.0356

C = Soaps, *r*. (137)

$C_2H_6O_2$

Ethylene glycol

C = K_2SO_4

t = 25° (42)

Wt. % soln.

B	C
K_2SO_4	
3.16	9.67
9.78	7.69
18.47	5.74
32.11	3.57
49.03	1.83

$C_3H_4O_4$

Malonic acid

C = $C_7H_5NO_4$

o-Nitrobenzoic acid

t = 25° (74)

Mol/l soln.

B	C
$C_7H_5NO_4$	
0.03126	0.0428
0.1009	0.04153
0.2004	0.03967

C = $C_7H_6O_3$

Salicylic acid

t = 25° (74)

$C_7H_6O_3$	
0.03126	0.01485
0.1009	0.01408
0.2004	0.01362

$C_3H_5IO_2$

β-Iodopropionic acid

C = $NaC_3H_4IO_2$

β-Iodopropionate

t = 25° (127)

Mol B/l soln.	Mol C/l (A+B)
$C_3H_5IO_2$	
0.040	0
0.63	1.0

C_3H_6O

Acetone

C = $C_{12}H_{22}O_{11}$, Sucrose

See also Vol. III, p. 401

t = 25° (85)

Wt. % aqueous sugar soln.

B	C
582	10
250	20
150	30
92.8	40
48.1	50
24.2	60
12.8	70

C = $CuCl_2$

t = 30° (69)

Wt. % soln.

B	C
$CuCl_2.2H_2O$	
0.0	43.95
5.00	41.00
13.16	37.47
19.10	35.58
32.90	29.18
42.50	26.20
49.03	22.90
67.43	14.97
76.40	11.80
82.20	9.77
92.98	4.70
$CuCl_2.2C_3H_6O$	
98.97	1.03

C = $CaCl_2$ (69); *cf.* (43)

t = 0°

B	C
$CaCl_2.6H_2O$	
0.0	37.3
10.3	33.9
16.6	32.3
18.9	31.2
27.0	30.6
28.45	30.45
Aqueous layer	
30.27	30.55
29.3	27.53
31.6	18.12
41.6	10.10
65	3*
Acetone layer	
65	3*
84.2	0.10
93.1	0.04
98.3	0.01
99.9	0.0

C = $CaCl_2$.—(*Continued*)

Wt. % soln.

B	C
t = 28°	
$CaCl_2.6H_2O$	
0.0	46.1
5.9	45.9
$CaCl_2.6H_2O + CaCl_2.4H_2O$	
10.8	44.4
$CaCl_2.4H_2O$	
13.4	44.4
15.0	43.9
$CaCl_2.4H_2O + CaCl_2.3C_3H_6O$	
15.3	44.2
$CaCl_2.3C_3H_6O$	
15.7	42.9
20.5	40.5
21.1	40.4
Aqueous layer	
21.03	40.30
19.85	34.38
19.08	29.99
19.97	25.63
21.76	21.77
26.45	16.60
41.50	9.58
47.60	7.33
61.50*	3.50*
Acetone layer	
61.50*	3.50*
73.50	1.31
77.50	0.18
89.20	0.04
92.35	0.01
99.30	0.01
99.90	0.0

* Critical solution, composition by extrapolation.

C = $BaCl_2$

t = 18° (69)

$BaCl_2.2H_2O$	
0.0	26.04
9.3	21.20
15.1	17.69
33.3	9.75
41.3	7.18
60.0	3.28
73.7	2.40
98.8	0.01

C = Li_2SO_4

t = 28° (69)

$Li_2SO_4.H_2O$	
0	25.20
4.90	21.00
Aqueous layer	
7.38	19.65
11.80	16.10
15.70	13.20
27*	8*
Acetone layer	
27*	8*
39.65	19.65
48.50	2.00
56.10	0.90
One liquid phase	
63.4	0.6

C = Li_2SO_4.—(*Continued*)

Limiting conjugate solutions

t°	Wt. % soln. B	C
Aqueous layer		
35	6.75	19.90
28	7.38	19.65
18	7.34	19.68
0	8.70	19.05
Acetone layer		
35	58.4	0.76
28	56.1	0.90
18	53.5	1.42
0	43.5	3.00

* Critical soln. Inferior critical temperature at −20°.

C = NaCl

t = 20° (69); *cf.* (43)

Vol. % B in (A + B)	Mol C/l soln
NaCl	
One liquid phase	
0	5.379
10	4.646
20	3.948
30	3.301
Two liquid phases	
32	3.085
87	0.077
One liquid phase	
88	0.073
89	0.056
90	0.043

t = 25°

Wt. % soln.

B	C
NaCl	
0.0	26.60
8.6	22.66
13.9	20.38
Aqueous layer	
20.4*	17.58*
22.6	16.20
28.3	12.97
40.8	8.60
54.5†	5.5†
Acetone layer	
54.5†	5.5†
66.8	2.61
76.4	0.98
81.7	0.57
84.1*	0.44*
One liquid phase	
89.6	0.30
100	0.00

* Limiting conjugate layers.
† Critical solution.

C = NaI, *v*. (89)

C = Na_2SO_4 (69)

t = 28°

$Na_2SO_4.10H_2O$	
0	25.80
4.4	20 30

C_3H_6O.—(*Continued*)

C = Na_2SO_4.—(*Continued*)

Wt. % soln. B	C
$Na_2SO_4.10H_2O$	
8.3	15.80
10.3	14.20
24.7	4.59
33.6	2.11
47.0	0.15
55.0	0.13
$Na_2SO_4.10H_2O + Na_2SO_4$	
88.1	0.01
Na_2SO_4	
94.0	0.00
t = 31°	
$Na_2SO_4.10H_2O$	
0.0	29.70
Aqueous layer	
2.6	27.37
3.1	26.20
7.5	20.40
17*	12*
Acetone layer	
17*	12*
30.0	4.50
37.1	2.00
39.0	1.82
One liquid phase	
40.0	1.70
Na_2SO_4	
84.1	0.02
t = 35°	
Na_2SO_4	
0	33.1
Aqueous layer	
1.78	28.90
3.50	25.20
4.65	23.23
10.60	17.00
16*	12*
Acetone layer	
16*	12*
22.3	7.71
32.4	3.51
36.2	2.44
45.1	1.15
One liquid phase	
65.60	0.09

Limiting conjugate layers

t°	Wt. % soln. B	C
Aqueous layer		
Na_2SO_4		
50	3.90	26.26
40	2.80	28.06
35	1.78	28.90
$Na_2SO_4 + Na_2SO_4.10H_2O$		
32	1.74	29.54
$Na_2SO_4.10H_2O$		
31	2.60	27.37
30	6.20	21.20
29.6*	12*	13*

C = Na_2SO_4.—(*Continued*)

t°	Wt. % soln. B	C
Acetone layer		
Na_2SO_4		
50	46.3	1.09
40	45.2	1.11
35	45.1	1.15
$Na_2SO_4 + Na_2SO_4.10H_2O$		
32	45.1	1.06
$Na_2SO_4.10H_2O$		
31	39.0	1.82
30	26.0	5.53
29.6*	12*	13*

* Critical solution.

C = $NaNO_3$ (69)

Wt. % A in (A + B)	Wt. % C in soln.
One liquid phase	
$NaNO_3$	
t = 30°	
100	49.10
95	46.96
90.91	45.11
80	40.10
70	35.08
60	29.80
50	24.34
40	18.55
30	11.35
20	7.10
10	1.89
t = 40°	
100	51.1
91.53	47.7
83.19	43.9
74.81	39.9
65.71	36.7
55.89	31.6
46.10	24.7
35.18	18.7
24.03	9.8
12.38	3.1

t = 43.5°

Wt. % soln. B	C
$NaNO_3$	
0	52.30
4.9	48.15
15.5	40.0
24.8	33.90
Aqueous layer	
34.4	27.55
41.1	23.30
Acetone layer	
65.1	10.60
72.8	8.06

Critical temperature = 41.3°.

C = $NaC_6H_3N_2O_5.H_2O$

Dinitrophenate

t = 25° (38)

Vol. % B in (A + B)	g C/l soln.
$NaC_6H_3N_2O_5.H_2O$	
0	44.61
10	48.59
20	54.70
30	60.86
40	68.50
50	74.42
60	77.84
70	75.68
80	65.36
90	43.56
100	10.85

C = **KF**

t = 20° (43)

Wt. % soln. B	C
$KF.2H_2O$	
1.42	32.58
5.81	20.19
9.87	16.13
11.81	14.69
17.57	11.43
17.81	11.19
22.48	9.52
25.38	8.62
28.41	7.59
28.53	7.47

C = K_2SO_4

t = room (42)

K_2SO_4	
4.92	7.20
10.06	5.02
16.23	2.96
24.31	1.50
37.19	0.47
46.29	0.20
62.40	0.03

C = K_2CO_3

t = 20° (43)

$2K_2CO_3.3H_2O$	
32.0	6.67
32.5	6.02
40.0	3.51
42.10	2.92
44.87	2.38
48.70	1.72
48.97	1.59
52.11	1.21
55.67	1.11
64.0	0.7

C = $KC_6H_2N_3O_7$

Picrate

t = 25° (38)

Vol. % B in (A + B)	g C/l soln.
$KC_6H_2N_3O_7$	
0	6.45
10	7.26
20	8.76

C = $KC_6H_2N_3O_7$.—(*Cont'd*)

Vol. % B in (A + B)	g C/l soln.
$KC_6H_2N_3O_7$	
30	11.40
40	15.55
50	21.06
60	26.15
70	30.90
80	33.40
90	30.84
100	10.80

$C_3H_6O_2$

Propionic acid

C = $C_{10}H_8$

Naphthalene (20)

Wt. % soln. B	C
$C_{10}H_8$	
t = 0°	
69.1	1.5
78.6	3
86.6	6
89.6	9.97
t = 25°	
26.9	0.1
38.1	0.3
49.6	0.75
58.7	1.5
67.3	3
74.3	6
80	10.92
80.4	16.3
78.8	20.95

C = $AgC_3H_5O_2$

Propionate

t = 25° (81)

Mol B/l (A + B)	g C/l soln.
$AgC_3H_5O_2$	
0	9.04
1.00	8.58
2.00	8.01
2.97	7.60
4.95	6.78
6.97	5.78
8.56	4.96
11.40	3.16
13.03	2.17

C_3H_8O

Propyl alcohol

C = $C_{10}H_8$

Naphthalene (20)

Wt. % soln. B	C
$C_{10}H_8$	
t = 0°	
23.7	0.105
27.4	0.214
33.7	0.432
45.1	1.110

C = $C_{10}H_8$.—(*Continued*)

Wt. % soln. B	C
	$C_{10}H_8$
	$t = 25°$
58.8	2.28
69.7	3.61
80.4	5.81
85.5	7.84

C = **NaCl** (5)

Mol B/kg A	g C/kg A 0°	25°
	NaCl	
0	357.8	363.0
0.25	351.2	355.8
0.50	345.6	350.2

C = **KCl** (5)

	0°	25°
	KCl	
0	283.6	365.1
0.25	274.1	355.4
0.50	265.5	347.7
1.0	248.0	331.5

$C_3H_8O_3$

Glycerol

C = $HgCl_2$

$t = 25°$ (97)

% B in (A + B)	g C/kg soln.
	$HgCl_2$
0	67.6
5.08	72.0
15.10	83.3
25	97.2
35	111.0
50.18	148.8
75.05	265.3
100	442.3

C = $Al(NH_4)(SO_4)_2.12H_2O$ (31)

C = $Ca(OH)_2$

$t = 25°$ (18)

Wt. % soln. B	C	d_4^{25} soln.
	$Ca(OH)_2$	
0	0.117	
3.50	0.178	1.008
15.59	0.413	
17.84	0.48	1.042
34.32	0.88	1.088
55.04	1.34	1.149

C = K_2SO_4

$t = 25°$ (42)

Wt. % soln. B	C
	K_2SO_4
8.96	8.87
13.36	7.69
20.34	6.47
24.15	5.83
33.73	4.44
40.40	3.65
43.52	3.38
50.18	2.69

C = K_2SO_4.—(*Continued*)

Wt. % soln. B	C
	K_2SO_4
57.22	2.07
67.94	1.53
78.18	0.98
98.28	0.73

C = Alkaloids, *v.* (9)

$C_4H_4N_2$

Succinonitrile

C = $C_4H_{10}O$

Ethyl ether (116)

$t°$	Mol % soln. A	B	C
	One liquid phase		
	Ice + $C_4H_4N_2$		
	Ether layer		
−16	4.4	2.9	92.7
	Aqueous layer		
− 4.5	95.5	1.1	3.3
− 1.2	98.71	1.29	0
	Two liquid phases		
	$C_4H_4N_2$		
	Ether layer		
− 4.5	6.3	3.5	90.1
− 2.5	6.6	4.0	89.3
1–2	7.5	4.9	87.5
	Aqueous layer		
− 4.5	95.5	1.1	3.3
− 2.5	95.4	1.3	3.2
1–2	95.1	1.6	3.1
	Three liquid phases		
	Ether layer		
1–2	7.5	4.0	87.5
10–11	8.5	5.3	86.1
20–21	9.0	5.4	85.5
30–31	9.4	5.4	85.0
	Aqueous layer		
1–2	95.1	1.6	3.1
10–11	95.4	2.1	2.5
20-21	95.3	2.6	2.0
30–31	94.6	3.6	1.8
	Nitrile layer		
1–2	27.9	55.6	16.4
10–11	30.5	52.1	17.3
20–21	37.9	45.5	16.5
30–31	45.1	39.5	15.3

C = $C_7H_6O_2$

Benzoic acid

$t°$	Mol % soln. A	B	C
	One liquid phase		
	$C_7H_6O_2$ + $C_4H_4N_2$		
0	98.48	1.47	0.04
11–12*	97.5	2.4	0.08
11–12	32.0	64.9	3.1
24	19.6	77.4	3.0
34	12.9	84.2	2.9
	Two liquid phases		
	Aqueous layer		
	$C_4H_4N_2$		
11–12*	97.5	2.4	0.08
15	97.38	2.58	0.04
18.5	97.5	2.5	0

C = $C_7H_6O_2$.—(*Continued*)

$t°$	Mol % soln. A	B	C
	$C_7H_6O_2$		
24	96.86	3.02	0.126
35–36	95.73	3.98	0.28
45–46	93.52	5.34	0.69
49–50	90.03	8.51	1.46
	Nitrile layer		
	$C_4H_4N_2$		
11–12*	32.0	64.9	3.1
15	32.5	66.2	1.3
18.5	28	72	0
	$C_7H_6O_2$		
24	43.5	52.5	4.0
35–36	53.2	41.8	4.9
45–46	62.1	32.5	5.4
50	78.0	18.2	3.8
51†	85	12.5	2.5

Mol % soln. A	B	C
	$C_7H_6O_2$	
	$t = 69°$	
99.7	0	0.3
92.35	5.56	2.08
86.41	9.40	4.19
80.22	13.04	6.74
64.07	24.41	11.51
47.61	39.73	12.66
0	93	7
	$t = 87°$	
99.4	0	0.61
97.13	1.21	1.66
93.6	2.4	7.0
84.93	3.35	11.71
72.70	6.73	20.57
53.8	20.92	25.28
30.41	46.67	22.61
0	88	12
	$t = 88 - 89°$	
72.5	0	27.5
58.79	3.67	37.53
48.24	11.15	40.61
30.51	38.13	31.26
0	80.8	19.2

* Quintuple point. † Critical solution.

$C_4H_2N_2O_4$

Alloxan

C = $C_8H_6N_4O_8$, Alloxantin

$t = 25°$ (12)

Mol/kg H_2O B	C
$C_4H_2N_2O_4$ +	$C_8H_6N_4O_8$
0.0573	0.00269
0.0407	0.00318
0.0310	0.00359
0.0295	0.00364
0.0276	0.00391
0.0146	0.00498
0.00920	0.00598
0.00703	0.00650
0.00400	0.00735
0.00193	0.00812
0.00161	0.00819
0.00114	0.00849
0.00082	0.00869

$C_4H_6O_4$

Succinic acid

C = $C_4H_{10}O$

Ethyl ether (142)

Wt. % soln. B	C	A	B
Aqueous layer		Ether layer	
	$C_4H_6O_4$		
	$t = 15°$		
5.05	0	0	0.353
5.11	0.34	0.03	0.39
5.18	1.60	0.41	0.61
5.36	4.22	0.51	0.68
5.44	5.37	0.76	0.86
5.49	5.86	1.27	1.9
5.68	8.22	1.33	1.24
3.47	8.25	1.41	1.29
3.22	8.07	1.36	1.03
1.73	7.94	1.17	0.59
0	7.83	1.04	0
	$t = 20°$		
6.30	0.0	0	0.420
6.39	1.00	0.30	0.60
6.53	2.83	0.56	0.75
6.64	3.88	0.83	0.97
7.01	6.77	1.12	1.20
7.00	6.92	1.53	1.48
7.10	7.23	1.34	1.12
4.88	7.16	1.40	0.86
3.03	7.01	1.23	0.53
0	6.89	1.10	0
	$t = 25°$		
7.67	0	0	0.487
7.73	0.49	0.22	0.66
7.91	1.85	0.60	0.90
7.95	2.10	0.62	0.91
7.99	3.53	0.68	0.95
8.12	3.26	1.07	1.27
8.21	4.02	1.24	1.34
8.23	3.89	1.39	1.49
8.31	4.28	1.66	1.69
8.49	5.49	1.53	1.21
8.62	6.14	1.51	1.21
8.67	6.03	1.42	0.80
8.76	6.56	1.41	0.79
6.44	6.39	1.29	0.41
4.38	6.24	1.19	0
2.27	6.09		
0	6.00		

C = **LiCl**; $t = 25°$ (54)

Mol B/l (A + B)	Mol C/l soln.
$C_4H_6O_4$	
0	0.672
0.18	0.60
0.55	0.53
1.36	0.40
2.76	0.25
4.16	0.17
5.46	0.12

C = **NaCl**; $t = 25°$ (54)

$C_4H_6O_4$	
0	0.672
0.32	0.63

$C_4H_6O_4$.—(*Cont'd*)

C = **NaCl**.—(*Continued*)

Mol B/l (A + B)	Mol C/l soln.
$C_4H_6O_4$	
0.56	0.59
1.10	0.52
2.26	0.41
4.95	0.23
$C_4H_6O_4$ + NaCl	
5.35	0.21
NaCl	
5.39	0.19
5.44	0.04
5.46	0.0

C = $\mathbf{Na_2C_4H_4O_4}$

Succinate (90)

D = $C_4H_6O_4.Na_2C_4H_4O_4.6H_2O$

E = $Na_2C_4H_4O_4.6H_2O$

F = $C_4H_6O_4.Na_2C_4H_4O_4$

G = $Na_2C_4H_4O_4.H_2O$

g/kg soln.

B	C
t = 0°	
B	
26.8	
47.6	32.3
58.3	53.8
B + D	
71.3	82.7
D	
62.6	86.7
47.4	96.8
34.9	117.4
23.4	156.2
D + E	
19.0	183.6
E	
16.7	180.7
9.4	178.7
	176.6
t = 25°	
B	
71.1	
102.6	36.8
119.8	64.9
133.5	89.9
155.3	126.4
B + D	
169.0	152.6
D	
138.3	159.7
119.8	165.0
84.1	188.9
56.5	227.1
E	
40.9	268.8
34.6	266.9
23.8	265.0
8.5	261.1
	258.7
t = 34.9°*	
D + E + F	
56.0	308.0

C = $\mathbf{Na_2C_4H_4O_4}$.—(*Cont'd*)

g/kg soln.

B	C
t = 37.8°*	
B + D + F	
254.6	196.0
t = 38.7°	
D + F	
164.5	224.8
t = 50°	
B	
192.7	
229.0	59.5
253.3	102.5
269.6	126.0
287.3	154.9
309.8	189.4
B + F	
317.3	196.6
F	
287.1	202.2
265.1	207.2
236.1	215.0
219.8	217.0
184.4	225.3
170.0	232.6
155.7	238.0
130.9	255.3
94.6	282.8
73.8	304.8
42.1	369.5
F + E	
42.0	373.8
E	
38.8	368.5
26.6	366.7
	363.7
	365.0
t = 63.4°*	
E + F + G	
36.5	429.3
t = 64.9°	
E + G	
	455.3
t = 75°	
B	
376.0	
403.8	82.2
425.0	131.4
443.8	169.3
454.0	187.1
B + F	
459.9	195.6
F	
453.2	195.2
423.4	203.5
409.2	206.3
391.8	211.0
356.6	218.8
331.7	219.7
319.5	227.6
321.7	219.1
313.2	223.7
294.0	232.8
268.2	243.0

C = $\mathbf{Na_2C_4H_4O_4}$.—(*Cont'd*)

g/kg soln.

B	C
F	
205.0	263.5
193.4	269.0
152.8	294.5
77.9	361.1
49.3	412.6
F + G	
40.1	452.8
G	
31.7	453.6
12.3	459.3
	464.3

* Triple point.

C = **KCl**

t = 25° (54)

Mol B/l soln.	Mol C/l (A + B)
$C_4H_6O_4$	
0.52	3.58
0.59	2.02
0.63	1.04
0.64	0.38
0.672	0

C = **KBr**

t = 25° (54)

$C_4H_6O_4$	
0.53	4.22
0.59	2.19
0.64	0.55

C = **KI**

t = 25° (54)

$C_4H_6O_4$	
0.66	0.62
0.67	0.28

$C_4H_6O_5$

Malic acid

C = $\mathbf{Cu(OH)_2}$, *v.* (141)

$C_4H_6O_5$

Acetic anhydride

C = $\mathbf{Na_2O}$ (32)

D = $NaC_2H_3O_2.3H_2O$

E = $NaC_2H_3O_2.C_2H_4O_2$

F = $NaC_2H_3O_2.2C_2H_4O_2$

G = $C_2H_4O_2$

H = $NaC_2H_3O_2$

Wt. % soln.

B	C
t = 5°	
D	
28.41	10.14
D + E	
40.24	10.08
E	
43.89	9.03
46.38	8.88
F	
49.73	8.23
58.83	6.72
75.98	4.56
92.88	1.25
t = 15°	
H	
0.15	29.34

C = $\mathbf{Na_2O}$.—(*Continued*)

Wt. % soln.

B	C
D	
4.19	25.94
4.88	22.24
12.01	15.49
23.54	11.45
D + E	
34.56	11.25
E	
39.08	10.33
39.73	10.24
49.32	9.16
E + F	
54.34	8.56
F	
61.63	7.06
68.81	6.17
70.55	5.95
73.02	5.52
77.60	4.84
84.15	3.44
86.61	2.87
90.56	2.16
95.87	1.02
98.09	0.79
t = 20°	
F	
76.58	5.01
77.33	4.89
80.12	4.36
84.31	3.19
89.75	2.10
89.88	1.88
92.77	1.33
t = 25°	
D	
2.04	24.12
2.52	22.55
3.83	19.82
8.55	14.46
16.56	10.07
40.00	9.75
D + E	
41.23	9.77
E	
43.94	9.04
E + F	
44.80	8.96
F	
45.10	8.72
50.03	7.83
55.92	7.00
60.64	6.26
64.79	5.66
71.13	4.95
79.29	4.02
92.29	1.05
93.69	0.95
94.66	0.74
96.16	0.57
97.51	0.42
G	
76.42	2.01
76.34	2.49

C = Na_2O.—(*Continued*)

Wt. % soln.

B	C
G	
77.30	2.33
77.67	3.48
90.31	1.14
90.07	1.41
88.97	1.84
87.64	2.06
G + F	
87.90	2.19
t = 30°	
H	
0.77	35.31
8.92	26.25
D	
9.06	25.98
13.62	18.09
21.88	13.53
D + E	
33.05	13.24
E	
32.90	13.14
65.07	7.64
E + F	
66.42	7.67
F	
69.68	7.33
71.39	6.94
72.85	6.61
77.76	5.52
83.92	3.78
86.73	2.94
94.78	1.27
t = 45°	
H	
0.77	39.82
2.04	32.69
6.53	28.86
14.29	25.58
D	
18.70	23.12
18.85	22.46
19.44	21.12
26.39	16.04
D + E	
33.87	16.00
E	
36.28	14.12
41.12	12.61
44.85	11.81
51.00	10.84
55.68	10.15
56.37	10.32
61.49	9.34
65.11	9.04
65.74	8.86
68.21	8.63
70.06	8.54
75.06	8.20
F	
82.16	5.54
83.64	4.64
85.38	4.25
86.39	4.20
94.23	2.36

C = Na_2O.—(*Continued*)

Wt. % soln.

B	C
E	
97.19	1.19
98.37	0.93
t = 60°	
H	
0.00	46.22
1.83	36.25
2.07	35.55
2.83	34.60
4.56	31.38
7.96	29.31
14.31	26.60
15.58	26.26
25.73	23.90
36.17	21.99
E	
37.41	17.75
49.62	12.57
60.84	10.73
64.23	10.27
66.97	9.86
F	
77.83	8.31
84.44	6.07
85.71	5.74
E	
90.22	4.25
94.46	3.08
t = 75°	
H	
0.76	44.45
2.12	39.40
3.24	35.37
5.03	32.47
15.45	27.38
26.47	24.48
36.69	22.30
E	
43.06	17.85
56.53	12.78
58.69	12.13
65.71	11.05
68.56	10.54
77.37	8.84
78.28	9.02
78.75	8.61
81.49	7.63
89.61	4.09
90.72	3.63
98.35	0.44

$C_4H_6O_6$

d-Tartaric acid

C = $HgCl_2$ (97)

t = 25°

Wt. % B in (A + B)	g C/ kg soln.
	$HgCl_2$
10	63.6
20	58.0
25	54.2
35	45.8
42.5	39.9
50	33.1

C = H_3BO_3

t = 25° (56)

Mol/l soln.

B	C
	H_3BO_3
0	0.901
0.75	1.000
1.5	1.070
3.0	1.207

$C_4H_6O_6$

dl-Tartaric acid

C = H_3BO_3

t = 25° (56)

	H_3BO_3
0.63	0.986
1.26	1.046
2.47	1.165

$C_4H_7NO_4$

Aspartic acid

C = Salts

t = 20° (145)

Salt	g B/l soln.	Mol C/l (A + B)
	$C_4H_7NO_4$*	
$MgCl_2$	6.20	0.5
$CaCl_2$	6.10	0.429
	7.43	0.858
	10.00	1.716
$Ca(NO_3)_2$	7.55	0.49
$SrCl_2$	6.46	0.5
$SrBr_2$	6.48	0.486
$Sr(NO_3)_2$	6.08	0.204
	7.57	0.408
	9.45	0.816
	13.60	1.63
$BaCl_2$	7.00	0.5
LiCl	4.88	1.17
NaCl	4.76	0.5
	5.21	1.0
	5.56	2.0
	5.75	4.0
KCl	5.40	1.0
KBr	5.00	0.5
	5.45	1.0
	6.40	2.0
	7.41	4.0
KI	5.65	1.0
K_2SO_4	0.5	6.86
KNO_3	1.0	6.33
$KC_2H_3O_2$	1.0	52.4

*Solubility in pure H_2O = 4.10 g/l.

$C_4H_8O_2$

Butyric acid

C = $C_{10}H_8$

Naphthalene (20)

Wt. % soln.

B	C	B	C
t = 0°		*t* = 25°	
	$C_{10}H_8$		
75.3	4.12	55.3	4.07
84.3	8.27	65.2	6.07
86.9	9.67	75	12.4
		76	15.5
		76.3	20.7

$C_4H_{10}O$

Ethyl ether

C = CdI_2

t = 12° (140)

g A/kg B	g C/kg (A + B)
	CdI_2
0	1.43
1.0	7.8
3.0	20.7
5.0	33.6
7.0	47.7
9.0	64.6
10.0	73.0
11.0	82.7
11.4*	86.8

* Saturated with H_2O.

$C_4H_{12}IN$

Tetramethylammonium iodide

C = KOH

t = 25° (61)

g B/l soln.	Mol C/l (A + B)
$C_4H_{12}IN$	
52.72	0
52.30	0.057
51.88	0.112
50.40	0.251

C_5H_5N

Pyridine

C = $C_{12}H_{22}O_{11}$

Lactose (105)

Wt. % B in (A+B)	g C/kg (A + B) *t* = 1°	*t* = 25°
	$C_{12}H_{22}O_{11}$	
0	192	230
10	178	224
20	153	192
30	129	155
40	95	106
50	69	78
60	46	56
70	29	32
80	16	26
90	18	18
91	18	18
100	16	22

C = $C_{18}H_{32}O_{16}$

Raffinose

t = 25° (105)

Wt. % B in (A + B)	g C/kg (A + B)
	$C_{18}H_{32}O_{16}$
0	298
10	231
20	222
30	189
40	134
50	99
60	65
70	53
80	74
90	245

C_5H_5N.—(*Continued*)

C = $C_{18}H_{32}O_{16}$.—(*Continued*)

Wt. % B in (A + B)	g C/kg (A + B)
	$C_{18}H_{32}O_{16}$
91	246
92	247
94	369
96	419
98	457
100	791

C = **Various organic substances**, *v.* ([28])

C = **K_2SO_4**
t = 25° ([42])

Wt. % soln. B	C
K_2SO_4	
4.23	7.95
13.90	4.77
24.51	2.75
34.19	1.47
46.29	0.45
55.93	0.12
75.90	0.006

$C_6H_3N_3O_7$

Picric acid

C = **$C_7H_5N_3O_7$**
Methylpicric acid ([74])

C_6H_6

C = **C_6H_6O**, Phenol ([109])

C = **$AgClO_4$**
t = 25° ([62])

Wt. % soln. B	Wt. % soln. C	d_4^{25} soln.
$AgClO_4.H_2O$		
0	84.45	2.806
1.19	84.28	2.823
$AgClO_4.H_2O + AgClO_4.C_6H_6$		
1.70	84.10	
$AgClO_4.C_6H_6$		
1.68	83.98	2.806
1.36	83.93	2.808
1.55	83.12	2.747
1.41	81.30	2.644
7.75	75.53	
15.81	69.27	2.103
22.32	65.69	1.978
27.84	62.34	1.871
28.14	62.01	1.851
43.18	51.89	1.562
50.34	46.80	1.462
55.53	42.51	1.358
63.52	35.20	1.254
67.54	31.45	1.197
73.90	25.40	1.123
84.29	15.37	1.021
85.01	14.65	1.006
85.82	13.90	1.000
89.13	10.65	
90.26	9.55	0.949
90.45	9.38	0.9474
90.84	9.01	0.947

C = **$AgClO_4$**.—(*Continued*)

Wt. % soln. B	Wt. % soln. C	d_4^{25} soln.
$AgClO_4.C_6H_6$		
91.60	8.28	0.9367
92.58	7.31	0.9332
93.08	6.84	0.9259
93.77	6.18	0.9221
94.00	5.96	0.9205
95.00	5.00	0.906

C_6H_6O

Phenol

C = **$C_6H_6O_3$**
Pyrogallol
t = 20° ([7])

Wt. % soln. B	C
$C_6H_6O_3$	
7.9	
8.5	0.8
9.2	1.6
12.5	4.1
19.2	5.3
24.5	5.8
30.1	6.0
38.7	5.9
43.2	5.7
45.2	5.5
53.1	4.8
61.0	3.3
66.9	1.7
71.4	

C = **C_7H_8O**
o-, *m*- or *p*-Cresol ([64])

Wt.% Phenol*	t of fusion
$C_6H_6O.H_2O$	
100	16.0
95	14.25
90	12.25
85	10.25
80	8.1
75	5.8
70	3.4
65	+0.75
60	−2.2
55	−5.2

*H_2O always 9.1 wt. %. All percentages expressed on the phenol-cresol mixture.

C = **$C_8H_6O_4$**
Phthalic acid
t = 25.00° ([108])

C,* Rel. solubility	Mol B/l (A + B)
$C_8H_6O_4$	
1.014	0.1015
1.027	0.1930
1.058	0.3723
1.097	0.646
1.143	0.946
1.235	1.433
1.366	2.026

* Unit of solubility is that in pure water, which = 0.04185 g-Mol/l; (d_4^{25} = 1.0022).

C = **$NaC_{18}H_{33}O_2$**
Oleate ([7])

Wt. % soln. B	C
$NaC_{18}H_{33}O_2$	
t = 0°	
7.2	0
8.7	0.2
12.1	0.8
16.0	1.3
23.4	2.1
34.8	2.9
58.5	4.4
64.7	3.5
70.4	2.0
74.7	
t = 20°	
7.9	
9.8	0.2
13.2	0.6
16.5	1.0
22.9	1.4
41.2	2.3
59.7	3.1
62.6	2.8
70.8	0.4
71.4	
t = 40°	
9.4	
12.8	0.2
16.2	0.4
24.2	0.8
48.4	1.8
50.5	1.8
57.6	1.7
61.0	1.3
64.5	0.5
65.6	
t = 60°	
17.6	
28.4	0.2
36.7	0.1
53.6	

C = **$Ca(OH)_2$**
t = 25° ([95])

Wt. % soln. B	C
C_6H_6O	
93.78	0
93.38	0.69
$C_6H_6O + Ca(C_6H_5O)_2.3H_2O$	
93.23	1.75
$Ca(C_6H_5O)_2.3H_2O$	
90.81	2.14
83.51	4.68
74.03	6.24
71.72	6.59
66.69	7.53
61.29	7.47
49.06	8.04
40.69	8.36
37.62	8.23
28.99	7.71
20.18	6.92
$Ca(C_6H_5O)_2.3H_2O + Ca(OH)_2$	
12.05	4.74

C = **$Ca(OH)_2$**.—(*Continued*)

Wt. % soln. B	C
$Ca(OH)_2$	
9.91	4.06
6.11	2.61
2.05	0.93
0	0.12

C = **$Sr(OH)_2$**
t = 25° ([95])

C_6H_6O	
90.46	2.96
87.42	5.32
$C_6H_6O + Sr(C_6H_5O)_2.4H_2O$	
84.93	8.28
$Sr(C_6H_5O)_2.4H_2O$	
75.71	11.55
57.09	13.95
51.16	14.51
32.14	14.66
$Sr(C_6H_5O)_2.4H_2O + Sr(OH)_2.8H_2O$	
22.52	14.75
$Sr(OH)_2.8H_2O$	
21.10	13.79
19.00	12.46
15.64	10.35
6.14	4.59
2.47	2.34
0	1.00

C = **$Ba(OH)_2$**
t = 25° ([95])

C_6H_6O	
93.78	0
90.81	3.69
88.40	5.66
$C_6H_6O + Ba(C_6H_5O)_2.4H_2O$	
88.46	5.74
$Ba(C_6H_5O)_2.4H_2O$	
88.10	5.74
77.47	9.92
64.92	13.26
48.68	15.45
41.18	15.30
36.68	15.10
18.64	13.02
14.68	12.32
13.16	12.46
$Ba(C_6H_5O)_2.4H_2O + Ba(OH)_2.8H_2O$	
12.63	13.65
12.67	13.62
$Ba(OH)_2.8H_2O$	
10.74	12.02
6.77	9.10
3.62	6.74
0	4.54

C = **LiOH**
t = 25° ([95])

C_6H_6O	
93.78	0
93.28	0.5[illegible]

C = **LiOH**.—(*Continued*)

Wt. % soln.

B	C
$C_6H_6O + LiC_6H_5O.2H_2O$	
92.89	0.70
92.39	0.71
$LiC_6H_5O.2H_2O$	
91.81	0.71
91.62	0.79
84.32	1.49
80.70	1.76
69.16	2.53
60.00	2.90
46.35	3.12
30.16	3.28
11.16	3.17
5.03	6.61
$LiC_6H_5O.2H_2O + LiOH.H_2O$	
2.03	10.52
2.03	10.55
$LiOH.H_2O$	
1.14	10.67
0	11.39

C = **NaOH**

$t = 25°$ (95)

C_6H_6O	
92.49	1.79
91.94	3.03
$2C_6H_6O.NaC_6H_5O$	
89.15	4.46
84.36	6.70
78.82	9.14
76.32	10.32
69.53	13.33
$NaC_6H_5O.3H_2O$	
65.18	14.51
62.39	15.16
55.75	16.31
50.73	17.43
42.32	18.74
40.01	19.34
32.34	22.54
23.95	25.95
18.76	28.03
8.14	32.63
2.42	40.00
0.32	44.43
$NaOH.H_2O$	
0	53.27

C = **KOH**

$t = 25°$ (95)

C_6H_6O	
92.12	0.58
92.50	2.98
$3C_6H_6O.KC_6H_5O$	
85.04	6.14
80.14	7.76
76.86	9.00
66.25	13.08
59.28	20.40
$3C_6H_6O.KC_6H_5O + KC_6H_5O.2H_2O$	
60.37	21.65
$KC_6H_5O.2H_2O$	
55.10	21.74
50.43	22.99

C = **KOH**.—(*Continued*)

Wt. % soln.

B	C
$KC_6H_5O.2H_2O$	
39.85	24.62
27.18	28.21
18.71	30.32
3.50	36.24
0.12	52.25
$KOH.2H_2O$	
0	54.34

$C_6H_6O_2$

Resorcinol

C = **Ba(OH)₂**

$t = 25°$ (95)

$C_6H_6O_2$	
65.96	0
63.43	8.01
61.87	15.14
61.47	20.90
$BaC_6H_4O_2.2H_2O$	
31.96	34.59
28.75	35.93
$BaC_6H_4O_2.2H_2O + Ba(OH)_2.8H_2O$	
23.24	37.78
$Ba(OH)_2.8H_2O$	
18.14	31.19
12.89	23.03
10.37	19.52
6.36	13.80
0	5.32

C = **KOH**

$t = 25°$ (95)

$C_6H_6O_2$	
65.96	0
70.40	5.00
75.37	9.19
80.11	11.99
$KC_6H_5O_2.2H_2O$	
64.21	22.08
53.50	24.28
49.66	25.52
42.77	28.56
$KC_6H_5O_2.2H_2O + K_2C_6H_4O_2.4H_2O$	
41.16	29.17
41.10	29.20
$K_2C_6H_4O_2.4H_2O$	
37.47	29.64
32.33	30.00
29.45	29.96
22.31	32.30
13.51	36.48
2.93	46.84
1.38	52.38
$K_2C_6H_4O_2.4H_2O$ + KOH?	
1.40	56.62
1.38	56.58
KOH?	
1.37	56.79
$KOH.H_2O$	
0.57	56.81
0.31	56.70
$KCH.2H_2O$	
0	55.75

C_6H_7N

Aniline

C = **AgClO₄** (63)

$C_6H_8O_7$

Citric acid

C = **C₈H₁₀N₄O₂**

Caffeine (33)

C = **C₁₂H₂₂O₁₁**

Sucrose (83)

C = **HgCl₂**

$t = 25°$ (97)

Wt. % B in (A + B)	g C/kg soln.
$HgCl_2$	
10	66
25	57.8
50	40.7

$C_6H_{12}O_6$

Glucose

C = **NaCl**

$t = 25°$ (5); *cf.* (146)

Mol B/kg A	g C/kg A
NaCl	
0	361.4
0.25	364.2
0.50	364.3
1.0	369.9

C = **KCl**

$t = 25°$ (5)

KCl	
0	362.7
0.25	366.1
0.50	369.9
1.0	376.3
3.0	402.3

$C_6H_{13}NO_2$

Leucine

C = **Salts**

$t = 23.7°$ (123)

Salt*	g B/l soln.
$C_6H_{13}NO_2$†	
Ce chloride	21.56
Mg chloride	10.69
Ca chloride	11.49
Sr chloride	10.87
Ba chloride	10.32
Li chloride	9.06
Na chloride	8.37
Na bromide	9.03
Na iodide	9.52
Na sulfate	7.77
Na nitrate	9.03
Na formate	8.53
Na thiocyanate	10.24
Na acetate	7.55
Na chloroacetate	8.04
Na dichloroacetate	8.15
Na trichloroacetate	8.67
Na lactate	7.06
Na malonate	7.86
Na tartrate	7.49

C = **Salts**.—(*Continued*)

Salt*	g B/l soln.
$C_6H_{13}NO_2$†	
Na succinate	7.56
Na citrate	8.02
Na benzoate	8.94
Na salicylate	10.65
K chloride	8.57

$t = 20°$ (145)

Salt	Mol C/l (A + B)	g B/kg soln.
$C_6H_{13}NO_2$‡		
$CaCl_2$	0.297	10.85
	0.594	11.62
	1.18	12.81
	2.37	14.12
$MgSO_4$	0.5	9.15§
	1.0	7.89§
	2.0	4.59§
	Satd.	2.88§
$SrCl_2$	0.25	10.5
	0.5	10.96
	1.0	10.74
	2.0	10.38
$BaCl_2$	0.25	10.72
	0.5	11.36
	1.0	11.30
$Ba(ClO_4)_2$	0.457	12.9
$BaBr_2$	0.487	12.02
$Ba(C_2H_3O_2)_2$	0.5	10.3
LiCl	1.27	9.32
	2.54	8.80
	5.07	9.80
	11.4	9.06
NaCl	0.5	8.79
	1.0	8.04
	2.0	6.63
	4.0	3.87
	Satd.	2.62
	1.0	8.48§
	2.0	7.08§
	4.0	4.39§
KCl	0.5	8.93
	1.0	8.07
	2.0	6.40
	Satd.	3.55
KBr	2.0	7.10
KI	2.0	8.01
KNO_3	2.0	9.25
$KC_2H_3O_2$	2.0	8.24

* 1 *N* aqueous solution.

† Solubility in pure H_2O = 9.58 g/l.

‡ Solubility in pure H_2O = 9.84 g/l.

§ As estimated by van Slyke method.

$C_6H_{14}O_6$

Mannitol

C = **PbCl₂**

$t = 25°$ (76)

Mol B/l (A + B)	Mol C/l soln.
$PbCl_2$	
0.50	0.0408
0.25	0.0403

$C_6H_{14}O_6$.—(*Continued*)

$C = PbCl_2$.—(*Continued*)

Mol B/l (A + B)	Mol C/l soln.
$PbCl_2$	
0.125	0.0394
0.0625	0.0384
0.0313	0.0385
0.0156	0.0377
0	0.0388

$C = H_3BO_3$

$t = 25°$ (53); *cf.* (2)

Wt. % soln.

B	C
$C_6H_{14}O_6$	
17.7	0
20.8	2.28
24.7	5.13
25.4	5.54
$C_6H_{14}O_6.H_3BO_3$	
25.1	5.70
H_3BO_3	
5.43	4.25
11.5	4.68
17.2	5.07
20.0	5.28
22.5	5.52

$C = K_2SO_4$

$t = 25°$ (42)

K_2SO_4	
3.20	10.32
5.82	10.07
8.35	9.61
11.26	9.19
14.30	8.66
17.22	8.35

$C_7H_4BrNO_4$

5-Bromo-2-nitrobenzoic acid

$C = C_7H_4BrNO_4$

3-Bromo-2-nitrobenzoic acid

$t = 25°$ (65)

g B/l A	g C/l (A + B)
3-Bromo-2-nitrobenzoic acid	
0	0.33
1.19	1.35
2.04	2.16
2.99	3.09
4.02	4.08
4.98	5.02
5.87	5.92
10.00	7.41

$C_7H_4ClNO_4$

5-Chloro-2-nitrobenzoic acid

$C = C_7H_4ClNO_4$

3-Chloro-2-nitrobenzoic acid

$t = 25°$ (65)

3-Chloro-2-nitrobenzoic acid	
0	0.47
3.02	3.15
4.12	4.18
10.00	9.67

$C_7H_4N_2O_6$

3, 5-Dinitrobenzoic acid

$C = NaCl$

$t = 25°$ (133)

Mol B*/kg soln.	Mol C/l (A+B)
$C_7H_4N_2O_6$	
0.006168	0
0.006412	0.10
0.006305	0.25
0.006161	0.5
0.005389	1.0

$C = KCl$

$t = 25°$ (133)

$C_7H_4N_2O_6$	
0.006397	0.0333
0.006471	0.05
0.006581	0.10
0.006559	0.117
0.006546	0.143
0.006540	0.25
0.006470	0.5
0.006365	0.75
0.006147	1.0

$C = KNO_3$

$t = 25°$ (133)

Mol B†/kg soln.	Mol C/l (A+B)
$C_7H_4N_2O_6$	
0.006344	0
0.007499	0.25
0.008095	0.50
0.008913	1.0
0.009970	1.75

* After four to ten days.

† After several months, or by cooling hot satd. solution.

$C_7H_5NO_4$

o-Nitrobenzoic acid

$C = C_7H_5N_3O_7$

Methylpicric acid (74)

$C = C_7H_6O_3$

Salicylic acid

$t = 25°$ (74)

Mol/l soln.

B	C
$C_7H_5NO_4$	
0.04357	0.00937
0.04402	0.01356
0.04413	0.01624
$C_7H_6O_3$	
0.01565	0.01447
0.04310	0.01445
0.04358	0.01439

$C = KNO_3$

$t = 25°$ (133)

Mol B/kg soln.	Mol C/l (A+B)
$C_7H_5NO_4$	
0.04380	0.0
0.04627	0.25
0.04606	0.50
0.04448	1.00

$C_7H_5NO_4$

p-Nitrobenzoic acid

$C = NaC_7H_4NO_4$

p-Nitrobenzoate

$t = 25°$ (127)

Mol B/l soln.	Mol C/l (A+B)
$C_7H_5NO_4$	
0.0024	0
0.0046	1

$C_7H_5N_3O_7$

Methylpicric acid

$C = C_7H_6O_3$

Salicylic acid

$t = 25°$ (74)

Mol/l soln.

B	C
$C_7H_5N_3O_7$	
0.01063	0.00981
0.01072	0.01393
$C_7H_6O_3$	
0.00938	0.01532

$C_7H_6O_2$

Benzoic acid

$C = NaCl$

$t = 25°$ (132)

Mol B/l soln.	Mol C/l (A+B)
$C_7H_6O_2$	
0.02787	0
0.02542	0.25
0.02312	0.50
0.02602	0.75
0.01825	1.00

$C = NaC_7H_5O_2$

Benzoate

$t = 25°$ (127)

$C_7H_6O_2$	
0.026	0
0.044	1.0

$C = KCl$

$t = 25°$ (45)

$C_7H_6O_2$	
0.02799	0
0.02416	0.5
0.02802	1.0

$C = KCNS$

$t = 25°$ (45)

$C_7H_6O_2$	
0.02891	0.5
0.02950	1.0

$C_7H_6O_3$

Salicylic acid

$C = NaCl$

$t = 25°$ (132)

$C_7H_6O_3$	
0.01635	0.0
0.01644	0.10
0.01530	0.25
0.01504	0.375
0.01420	0.50
0.01305	0.75
0.01200	1.00

$C = NaC_7H_5O_3$

Salicylate

$t = 25°$ (127)

Mol B/l soln.	Mol C/l (A+B)
$C_7H_6O_3$	
0.016	0
0.036	1

C_7H_7NO

Benzamide

$C = Salts$

$t = 23.7°$ (123)

Salt*	g B†/l soln.
C_7H_7NO	
Mg chloride	10.90
Ca chloride	11.26
Sr chloride	11.01
Ba chloride	10.79
Li chloride	11.69
Na chloride	9.74
Na bromide	10.88
Na iodide	12.73
Na sulfate	8.21
Na formate	9.64
Na thiocyanate	13.57
Na acetate	9.68
Na chloroacetate	12.33
Na dichloroacetate	13.21
Na trichloroacetate	16.69
Na lactate	9.38
Na malonate	8.49
Na tartrate	8.30
Na succinate	8.71
Na citrate	8.41
Na benzoate	19.95
Na salicylate	20.61
K chloride	10.7

* 1 *N* aqueous solution.

† Solubility in pure H_2O = 12.75 g/l.

$C_7H_7NO_2$

Aminobenzoic acid

$C = NaCl$

$t = 25°$ (133)

Mol B/kg soln.	Mol C/l (A+B)
$C_7H_7NO_2$	
0.05565	0
0.05670	0.25
0.05712	0.50
0.05246	1.0

$C = KNO_3$

$t = 25°$ (133)

$C_7H_7NO_2$	
0.05606	0.10
0.05797	0.25
0.05802	0.50
0.05064	1.0

C_7H_8O

o-Cresol

C = $NaC_{18}H_{33}O_2$

Oleate

$t = 20°$ (7)

Wt. % soln.

B	C $NaC_{18}H_{33}O_2$
2.8	
7.5	2.3
10.5	3.7
31.3	8.5
49.5	8.5
67.3	7.4
75.5	5.6
80.6	3.5
84.0	1.3
85.1	0.7
85.7	0.4
86.0	0.3
86.4	

C_7H_8O

m-Cresol

C = $NaC_{18}H_{33}O_2$

Oleate (7)

$NaC_{18}H_{33}O_2$

B	C
$t = 20°$	
2.4	
5.2	1.2
11.0	3.5
16.0	5.2
23.6	7.2
36.4	9.1
42.6	11.0
45.1	13.3
52.8	14.1
61.6	12.2
71.4	8.3
81.2	3.7
84.9	1.9
87.2	
$t = 60°$	
3.0	
6.6	1.3
10.5	2.6
22.5	5.1
30.7	6.2
48.6	8.6
54.3	10.2
63.3	9.2
71.0	6.6
79.6	2.2
82.0	0.9
82.7	0.5
83.4	

C_7H_8O

p-Cresol

C = $NaC_{18}H_{33}O_2$

Oleate

$t = 20°$ (7)

$NaC_{18}H_{33}O_2$

B	C
2.0	
7.5	1.7
12.1	2.9

C = $NaC_{18}H_{33}O_2$.—(*Cont'd*)

Wt. % soln.

B	C $NaC_{18}H_{33}O_2$
17.2	4.1
35.6	7.2
38.9	7.6
48.8	9.1
62.4	9.0
71.0	6.2
76.4	4.1
80.3	2.5
81.8	1.8
85.2	

C_7H_9N

p-Toluidine

C = Salts

$t = 23.7°$ (123)

Salt*	gB†/l soln. C_7H_9N
Mg chloride	5.68
Ca chloride	5.51
Sr chloride	5.69
Ba chloride	5.10
Li chloride	6.08
Na chloride	5.38
Na bromide	5.99
Na iodide	7.32
Na sulfate	4.11
Na formate	4.57
Na thiocyanate	14.44
Na acetate	4.43
Na dichloroacetate	7.10
Na trichloroacetate	7.62
Na lactate	3.93
Na malonate	3.12
Na tartrate	3.67
Na succinate	4.00
Na citrate	3.37
Na benzoate	8.74
Na salicylate	12.72
K chloride	5.63

* 1 *N* aqueous solution.

† Solubility in pure H_2O = 7.10 g/l.

$C_8H_6O_4$

Phthalic acid

C = $C_{12}H_{22}O_{11}$

Sucrose

$t = 25.00°$ (108)

B,* Rel. solubility $C_8H_6O_4$	Mol C/l (A+B)
0.974	0.1547
0.955	0.2962
0.909	0.6199
0.864	0.950
0.822	1.426

* Unit of solubility is that in pure H_2O, which = 0.04185 g-Mol/l; (d_4^{25} = 1.0022).

C = $Hg(CN)_2$

$t = 25.00°$ (108)

B,* Rel. solubility $C_8H_6O_4$	Mol C/l (A+B)
1.003	0.0304
1.011	0.0668
1.030	0.1733
1.050	0.2959
1.069	0.4000

C = $MgCl_2$

$t = 25.00°$ (108)

$C_8H_6O_4$	
0.988	0.0628
0.951	0.1236
0.855	0.2690
0.765	0.4212
0.635	0.655
0.507	0.9215
0.365	0.317

C = $CaCl_2$

$t = 25.00°$ (108)

$C_8H_6O_4$	
1.005	0.0442
0.974	0.0877
0.861	0.295
0.667	0.672
9.546	0.948
0.374	1.461
0.117	3.038
0.0673	4.299

C = $BaCl_2$

$t = 25.00°$ (108)

$C_8H_6O_4$	
0.997	0.0488
0.971	0.0956
0.934	0.1770
0.877	0.3103
0.811	0.4615
0.714	0.676

C = LiCl

$t = 25.00°$ (108)

$C_8H_6O_4$	
0.985	0.0827
0.950	0.1957
0.902	0.3322
0.827	0.5354
0.737	0.815
0.616	1.250
0.497	1.727

C = NaCl

$t = 25.00°$ (108)

$C_8H_6O_4$	
0.982	0.1271
0.952	0.2439
0.880	0.4934
0.751	0.9697
0.591	1.601
0.476	2.203
0.363	2.978

C = Na_2SO_4 (93)

t°	gB/kg soln. 0 % C†	10 % C†	15 % C†
	$C_8H_6O_4$		
25	7.014	6.440	5.272
35	10.13	9.338	7.575
45	14.46	13.41	10.80
55	21.68	18.58	16.39
65	32.46	30.18	24.55
75	49.26	43.73	37.48
85	76.87	64.61	55.33

$t = 25.00°$ (108)

B,* Rel. solubility $C_8H_6O_4$	Mol C/l (A+B)
1.048	0.0541
1.088	0.1428
1.072	0.567
0.952	0.898
0.833	1.205
0.721	1.517

C = $NaNO_3$

$t = 25.00°$ (108)

$C_8H_6O_4$	
1.004	0.2518
0.981	0.487
0.923	0.998
0.861	1.488
0.795	1.962
0.731	2.463
0.667	2.981

C = KF

$t = 25.00°$ (108)

$C_8H_6O_4$	
2.448	0.1147
4.434	0.2925
6.410	0.5746

C = KCl

$t = 25.00°$ (108)

$C_8H_6O_4$	
1.013	0.0957
1.995	0.2571
1.954	0.5549
1.904	0.8635
1.830	1.299
1.744	1.808

C = $KClO_3$

$t = 25.00°$ (108)

$C_8H_6O_4$	
1.013	0.0282
1.023	0.1051
1.030	0.2085
1.029	0.3041
1.028	0.4055
1.026	0.5109
1.016	0.6126

* Unit of solubility is that in pure H_2O, which = 0.04185 g-Mol/l; (d_4^{25} = 1.0022).

† Wt. % in solvent.

$C_8H_6O_4$.—(*Continued*)

C = KBr

t = 25.00° (108)

B,* Rel. solubility	Mol C/l (A + B)
$C_8H_6O_4$	
1.013	0.0846
1.010	0.1760
0.996	0.3295
0.971	0.5586
0.938	0.808
0.785	1.828

C = $KBrO_3$

t = 25.00° (108)

$C_8H_6O_4$	
1.014	0.0192
1.023	0.0611
1.029	0.1312
1.033	0.2306
1.030	0.3902
1.027	0.4300

C = KI

t = 25.00° (108)

$C_8H_6O_4$	
1.014	0.0963
1.029	0.1893
1.021	0.3623
1.000	0.6713
0.947	1.250
0.913	1.510
0.851	1.981

C = KIO_3

t = 25.00° (108)

$C_8H_6O_4$	
1.011	0.0147
1.023	0.0317
1.061	0.0924
1.089	0.1525
1.125	0.2314
1.145	0.2901
1.176	0.3716

C = K_2SO_4

t = 25.00° (108)

$C_8H_6O_4$	
1.073	0.0265
1.102	0.0424
1.173	0.1063
1.231	0.2104
1.282	0.3721
1.312	0.6271

C = KNO_3

t = 25.00° (108)

$C_8H_6O_4$	
1.029	0.106
1.042	0.194
1.056	0.335
1.058	0.545
1.056	0.902
1.042	1.269
1.019	1.622
0.977	2.196

* Unit of solubility is that in pure H_2O, which = 0.04185 g-Mol/l; (d_4^{25} = 1.0022).

C = $KC_2H_3O_2$

Acetate

t = 25.00° (108)

B*, Rel. solubility	Mol C/l (A + B)
$C_8H_6O_4$	
3.040	0.0893
5.536	0.1984
7.04	0.3291
8.64	0.3384
11.9	0.547

C = RbCl

t = 25.00° (108)

$C_8H_6O_4$	
1.016	0.0779
1.023	0.2459
1.009	0.4558
0.978	0.772
0.937	1.142
0.883	1.598
0.821	2.085

C = CsCl

t = 25.00° (108)

$C_8H_6O_4$	
1.026	0.0692
1.043	0.1961
1.052	0.3444
1.058	0.5653
1.058	0.804
1.050	1.144
1.032	1.476

* Unit of solubility is that in pure H_2O, which = 0.04185 g-Mol/l; (d_4^{25} = 1.0022).

$C_8H_8O_2$

p-Toluic acid

C = $NaC_8H_7O_2$

Toluate

t = 25° (127)

Mol B/l soln.	Mol C/l (A + B)
$C_8H_8O_2$	
0.0031	0
0.0054	1

$C_8H_{10}N_4O_2$

Caffeine

C = $C_{11}H_{12}N_2O$

Antipyrine (84)

t°	A*
C = 95%*	
$C_{11}H_{12}N_2O$	
107.7	0
89.0	4.7
81.0	7.5
62.0	13.6
49.0	19.2
40.5	23.6
32.0	28.9
25.5	34.7
21.5	38.5
16.0	45.4

C = $C_{11}H_{12}N_2O$.—(*Cont'd*)

t°	A*
C = 90%*	
$C_{11}H_{12}N_2O$	
105.5	0
62.9	12.3
48.1	17.7
43.1	22.1
34.9	27.6
25.7	33.3
20.5	38.8
15.1	44.0
11.4	47.5
7.9	51.0
−0.1	57.0
C = 85%*	
$C_8H_{10}N_4O_2$	
108.0	0
92.0	4.3
70.1	8.8
54.5	13.0
32.8	18.4
$C_{11}H_{12}N_2O$	
37.4	23.4
32.2	27.5
25.9	31.7
$C_8H_{10}N_4O_2.C_{11}H_{12}N_2O$	
19.5	36.5
13.0	43.5
C = 80%*	
$C_8H_{10}N_4O_2$	
123.4	0
74.1	12.6
$C_8H_{10}N_4O_2.H_2O$	
46.2	20.2
C = 70%*	
$C_8H_{10}N_4O_2$	
145.1	0
129.0	4.6
115.0	8.7
91.3	14.1
73.9	18.5
55.0	23.1
$C_8H_{10}N_4O_2.H_2O$	
24.2	49.9
20.2	56.5
C = 60%*	
$C_8H_{10}N_4O_2$	
163.0	0
$C_8H_{10}N_4O_2.H_2O$	
50.5	30.7
47.0	36.3
44.4	40.1
40.5	44.3
34.2	52.3
29.3	58.3
28.0	62.6

t°	B†
C = 94%†	
$C_{11}H_{12}N_2O$	
89.0	0
85.0	4.9
81.5	10.9
$C_8H_{10}N_4O_2$	
89.0	14.9
105.0	19.2

C = $C_{11}H_{12}N_2O$.—(*Cont'd*)

t°	B†
C = 79.8%†	
$C_{11}H_{12}N_2O$	
48.0	0
47.5	6.1
47.5	10.3
$C_8H_{10}N_4O_2.H_2O$	
48.0	14.0
$C_8H_{10}N_4O_2$	
62.5	18.7
71.0	22.2
86.0	26.0
C = 69.2%†	
$C_{11}H_{12}N_2O$	
33.5	0
33.0	5.1
32.5	10.9
$C_8H_{10}N_4O_2.H_2O$	
39.0	15.2
47.0	19.9
$C_8H_{10}N_4O_2$	
57.6	24.6
76.0	29.0
91.0	34.4
C = 59.6%†	
$C_{11}H_{12}N_2O$	
23.2	0
21.5	5.7
$C_8H_{10}N_4O_2.H_2O$	
22.0	11.1
31.5	15.6
39.5	19.9
47.0	25.0
$C_8H_{10}N_4O_2$	
61.2	30.0
77.0	34.8
88.0	39.6
100.0	45.2
C = 49.7%†	
$C_{11}H_{12}N_2O$	
13.0	0
11.0	5.1
$C_8H_{10}N_4O_2.H_2O$	
19.2	10.8
31.5	16.4
38.5	20.2
45.2	25.2
50.5	29.8
$C_8H_{10}N_4O_2$	
66.5	35.8
78.5	40.0
C = 39.5%†	
$C_{11}H_{12}N_2O$	
0	0
−0.3	5.6
$C_8H_{10}N_4O_2.H_2O$	
14.5	11.0
25.0	15.3
35.5	19.2
45.3	24.9
51.0	30.0
$C_8H_{10}N_4O_2$	
59.2	36.2
70.0	39.8

C = $C_{11}H_{12}N_2O$.—(*Cont'd*)

$t°$	B†
C = 39.5%†	
$C_8H_{10}N_4O_2$	
80.5	44.0
91.5	48.3
C = 29.6%†	
Ice	
−2.0	0
$C_8H_{10}N_4O_2.H_2O$	
0	6.0
13.0	11.0
26.0	15.5
37.0	19.8
44.5	24.8
51.0	30.2
56.0	35.7
$C_8H_{10}N_4O_2$	
62.5	39.5
77.0	45.0
89.0	49.8
99.0	54.6
C = 15%†	
Ice	
−1.0	0
−1.5	2.8
−1.8	4.7
$C_8H_{10}N_4O_2.2H_2O$	
16.0	7.8
23.5	9.9
35.6	15.1
45.0	21.8
50.5	26.6
54.5	29.8
58.0	35.4
$C_8H_{10}N_4O_2$	
64.0	40.2
73.5	45.1
84.0	50.3

* Expressed as wt. % caffeine-antipyrine mixture.
† Expressed as wt. % water-antipyrine mixture.

C = $NaC_7H_5O_2$
Benzoate (102)
g/kg A

B	C
t = 25°	
$C_8H_{10}N_4O_2.H_2O$	
21.32	
83.21	66.67
301.5	318.8
381.0	450.0
448.3	585.5
$C_8H_{10}N_4O_2.H_2O + NaC_7H_5O_2.H_2O$	
517.4	767.5
$NaC_7H_5O_2.H_2O$	
462.7	766.8
247.9	695.6
94.75	629.7
0	611.7

C = $NaC_7H_5O_2$.—(*Cont'd*)
g/kg A

B	C
t = 49°	
$C_8H_{10}N_4O_2.H_2O$	
46.43	0
314.3	253.1
568.2	696.8
$C_8H_{10}N_4O_2.H_2O + NaC_7H_5O_2.H_2O$	
579.9	746.5
$NaC_7H_5O_2.H_2O$	
559.8	740.2
183.1	679.7
0	598.2

C = Salts
t = 23.7° (123); *cf.* (33)

Salt*	g B†/l soln.
$C_8H_{10}N_4O_2$	
Mg chloride	16.22
Ca chloride	16.41
Sr chloride	15.36
Ba chloride	14.86
Li chloride	21.80
Na chloride	12.75
Na bromide	20.43
Na iodide	43.77
Na sulfate	9.58
Na formate	11.00
Na thiocyanate	55.87
Na acetate	9.49
Na chloroacetate	16.47
Na dichloroacetate	32.34
Na trichloroacetate	80.82
Na lactate	9.10
Na malonate	8.20
Na tartrate	8.55
Na succinate	8.55
Na citrate	7.95
Na benzoate	150.60
Na salicylate	230.47
K chloride	13.19

* 1 *N* aqueous solution.
† Solubility in pure H_2O = 19.12 g/l.

$C_9H_8O_2$

Cinnamic acid
C = $NaC_9H_7O_2$
Cinnamate
t = 25° (127)

Mol B/l soln.	Mol C/l (A+B)
$C_9H_8O_2$	
0.0041	0
0.0105	0.5

$C_9H_9NO_3$

Hippuric acid
C = $NaC_9H_8NO_3$
Hippurate
t = 25° (127)

$C_9H_9NO_3$	
0.039	0
0.078	1

$C_9H_{10}O_2$

β-Phenylpropionic acid
C = $NaC_9H_9O_2$
β-Phenylpropionate
t = 11° (127)

Mol B/l soln.	Mol C/l (A+B)
$C_9H_{10}O_2$	
0.032	0
0.051	<1

$C_9H_{11}NO_2$

Phenylalanine
C = Salts
t = 23.7° (123)

Salt*	g B†/l soln.
$C_9H_{11}NO_2$	
Ce chloride	28.87
Mg chloride	15.56
Ca chloride	17.52
Sr chloride	15.92
Ba chloride	16.14
Li chloride	13.53
Na chloride	11.98
Na bromide	13.77
Na iodide	15.41
Na sulfate	11.45
Na nitrate	14.29
Na formate	12.49
Na thiocyanate	16.48
Na acetate	11.04
Na chloroacetate	12.31
Na dichloroacetate	13.20
Na trichloroacetate	14.29
Na lactate	9.67
Na malonate	11.65
Na tartrate	10.96
Na succinate	11.40
Na citrate	11.99
Na benzoate	15.86
Na salicylate	19.93
K chloride	12.79

* 1 *N* aqueous solution.
† Solubility in pure H_2O = 14.06 g/l.

$C_{10}H_{12}O_2$

Cis-tetrahydronaphthalene-1,2-diol
C = H_3BO_3
t = 25° (53)
Wt. % soln.

B	C
H_3BO_3	
1.85	3.94
2.08	3.92
2.09	3.93
$C_{10}H_{12}O_2.H_3BO_3$	
2.12	3.92
2.18	3.88
$C_{10}H_{12}O_2$	
1.99	1.55
2.10	3.29

$C_{10}H_{16}O_4$

d-Camphoric acid
C = $MgC_{10}H_{14}O_4$
Camphorate
t = 15° (72)
Wt. % soln.

B	C
$C_{10}H_{16}O_4$	
1.20	1.29
1.98	3.53
2.36	5.66
2.85	8.19
3.16	10.30
$C_{10}H_{16}O_4 + MgC_{10}H_{14}O_4.14H_2O$	
3.42	16.33
3.62	16.61
$MgC_{10}H_{14}O_4.14H_2O$*	
3.60	16.70
1.91	15.10
0.00	14.25

* $MgC_{10}H_{14}O_4.14H_2O$ effloresces to $MgC_{10}H_{14}O_4.7H_2O$ in air. $MgC_{10}H_{14}O_4.5H_2O$ separates from hot solutions.

C = $CaC_{10}H_{14}O_4$
Camphorate
t = 15° (72)
Wt. % soln.

B	C
$C_{10}H_{16}O_4$	
1.35	1.23
1.57	1.97
1.71	2.55
2.18	4.34
2.33	4.73
2.90	7.75
$C_{10}H_{16}O_4 + CaC_{10}H_{14}O_4.7H_2O$	
2.99	8.70
3.00	8.66
3.08	8.87
$CaC_{10}H_{14}O_4.7H_2O$	
3.07	8.59
1.50	7.94
0.00	7.37
$CaC_{10}H_{14}O_4.4H_2O$	
0.00	12.21
0.00	8.68 (100°)

C = $SrC_{10}H_{14}O_4$
Camphorate
t = 16−17° (72)
Wt. % soln.

B	C
$C_{10}H_{16}O_4$	
1.25	1.413
$SrC_{10}H_{14}O_4 + 3C_{10}H_{16}O_4.2H_2O$	
1.03	1.771
1.13	6.525
1.20	12.45
1.20	17.99
$SrC_{10}H_{14}O_4.4H_2O$	
0.00	16.76
0.00	12.86 (99°)

$C_{10}H_{16}O_4$.—(*Continued*)

C = $BaC_{10}H_{14}O_4$
Camphorate
D = $BaC_{10}H_{14}O_4.3C_{10}H_{16}O_4.2H_2O$
E = $BaC_{10}H_{14}O_4.4H_2O$
t = 16–17° (72)
Wt. % soln.

B	C
B + D	
0.68	0.134
0.84	0.150
D	
0.69	0.20
0.79	0.35
0.78	0.40
0.38	2.59
0.44	11.10
0.48	22.71
0.45	32.19
0.50	37.22
0.50	40.71
D + E	
0.525	40.96
0.50	40.99
E	
0.00	40.90
0.00	41.42
0.00	42.59

C = $Li_2C_{10}H_{14}O_4$
Camphorate
t = 16–17° (72)

$C_{10}H_{16}O_4$	
2.02	3.77
$Li_2C_{10}H_{14}O_4.7C_{10}H_{16}O_4$	
3.25	10.63
3.51	12.61
$Li_2C_{10}H_{14}O_4.C_{10}H_{16}O_4$	
3.99	20.56
3.43	24.69
2.87	37.16
0.00	40.80

C = $Na_2C_{10}H_{14}O_4$
Camphorate (72)
t = 13.5°

$C_{10}H_{16}O_4$	
0.623	0.00
$Na_2C_{10}H_{14}O_4.5C_{10}H_{16}O_4$	
2.87	9.06
2.74	13.28
2.68	14.99
2.64	17.53
2.77	20.36
2.77	26.57
2.74	30.69
2.63	32.75
$Na_2C_{10}H_{14}O_4.3H_2O$	
0.88	49.60
0.00	50.13
t = 14.5°	
$C_{10}H_{16}O_4$	
2.03	4.19

C = $Na_2C_{10}H_{14}O_4$.—(*Cont'd*)
Wt. % soln.

B	C
$C_{10}H_{16}O_4$ + $Na_2C_{10}H_{14}O_4.5C_{10}H_{16}O_4$	
2.97	7.80
$Na_2C_{10}H_{14}O_4.5C_{10}H_{16}O_4$	
2.94	10.46
2.77	17.43
2.89	27.41
$Na_2C_{10}H_{14}O_4.C_{10}H_{16}O_4$	
2.29	40.10
2.17	40.54
1.06	47.04
t = 19.5°	
$C_{10}H_{16}O_4$	
0.716	0.00
1.68	2.46
3.06	9.36
3.24	9.79
$Na_2C_{10}H_{14}O_4.5C_{10}H_{16}O_4$	
3.23	14.76
3.02	14.84
3.04	19.27
3.88	29.18
4.13	30.62
3.24	32.68
$Na_2C_{10}H_{14}O_4.C_{10}H_{16}O_4$	
1.68	40.38
1.40	43.92
1.83	44.16

C = $K_2C_{10}H_{14}O_4$
Camphorate
t = 15–17° (72)

$C_{10}H_{16}O_4$	
2.0	4.6
2.3	6.1
2.5	6.8
2.8	8.1
2.9	9.7
3.1	11.6
$K_2C_{10}H_{14}O_4.7C_{10}H_{16}O_4$	
2.9	12.4
3.1	22.1
3.2	25.1
3.3	28.6
$K_2C_{10}H_{14}O_4.3C_{10}H_{16}O_4$	
3.2	29.4
2.9	32.8
3.0	35.6
2.8	45.2
3.2	50.6
$K_2C_{10}H_{14}O_4.C_{10}H_{16}O_4.H_2O$	
3.2	58.2
2.6	59.3
1.5	62.4
$K_2C_{10}H_{14}O_4$	
1.1	66.8
1.0	69.0
0.9	69.7
$K_2C_{10}H_{14}O_4.5H_2O$	
0.0	65.83

$C_{11}H_{12}N_2O$

Antipyrine
C = $C_{11}H_{12}N_2O.C_7H_6O_3$
Antipyrine salicylate
t = 18° (82)

Mol B/l(A+B)	g C/l soln.
$C_{11}H_{12}N_2O.C_7H_6O_3$	
0	0.0132
0.025	0.00712
0.05	0.00520
0.10	0.00432

$C_{12}H_{22}O_{11}$

Sucrose
C = $HgCl_2$
t = 25° (97)

Wt. % B in (A + B)	g C/kg soln.
$HgCl_2$	
10	73.1
25	81.5
30	85.0
35	88.3
40	92.0
42.5	93.7
47	96.9
55	103.0

C = $Ca(OH)_2$
t = 25° (18); *cf.* (46)

Wt. % soln. B	Wt. % soln. C	d_4^{25} soln.
$Ca(OH)_2$		
0	0.117	0.983
0.62	0.188	1.000
4.82	0.73	1.021
7.50	1.355	1.037
9.87	2.31	1.051
11.90	3.21	1.067
15.1	4.57	1.092
17.42	5.38	1.109
19.86	6.07	1.123

C = $CaSO_3$ (111)

g B/l A	g C/l soln.
$CaSO_3$	
t = 45–46°	
116.0	0.36
240.0	0.54
420.0	0.54
713.0	0.40
0	0.48
t = 60–62°	
146.3	0.45
241.4	0.46
421.3	0.44
743.4	0.39
0	0.45

C = $Sr(OH)_2$ (126)

C = NaCl
t = 25° (115)
Wt. % soln.

B	C
$C_{12}H_{22}O_{11}$	
66.0	1.62
63.0	6.15

C = NaCl.—(*Continued*)
Wt. % soln.

B	C
$C_{12}H_{22}O_{11}$ + $NaCl.C_{12}H_{22}O_{11}.2H_2O$	
62.2	8.6
$NaCl.C_{12}H_{22}O_{11}.2H_2O$	
57.0	9.75
$NaCl.C_{12}H_{22}O_{11}.2H_2O$ + NaCl	
43.0	16.2
NaCl	
36.7	17.5
12.7	23.3

C = K_2SO_4
t = 25° (42)

K_2SO_4	
9.56	9.65
18.55	8.65
28.16	7.42
37.24	6.35
47.55	5.21
57.00	4.24

$C_{13}H_8N_4O_8$

o-Picraminobenzoic acid
C = KOH
t = 25° (24)
Mol/l soln.

B	C
$C_{13}H_8N_4O_8$ + $KC_{13}H_7N_4O_8$	
0.005794	0.006566
0.005775	0.006555
0.005675	0.006725

$C_{14}H_8O_2$

Phenanthraquinone
C = Salts (79)

$C_{11}H_{12}N_2O.C_7H_6O_3$

Antipyrine salicylate
C = $NaC_7H_5O_3$
Salicylate (82)

Mol B/l (A + B)	Mol C/l soln.
$C_{11}H_{12}N_2O.C_7H_6O_3$	
0	0.0132
0.05	0.0114
0.1	0.0122
0.2	0.0126

$C_{20}H_{14}O_4$

Phenolphthalein
C = Na_2O
t = 25° (10)
Wt. % soln.

B	C
$C_{20}H_{14}O_4$	
2.90	0.58
13.74	2.71
22.43	4.25
31.96	6.11
$NaC_{20}H_{13}O_4.8H_2O$	
36.06	6.95
37.73	7.48
41.16	8.32

C = Na_2O.—(*Continued*)

Wt. % soln.	
B	C
$NaC_{20}H_{13}O_4.4H_2O$	
33.34	6.78
37.36	9.31
41.45	9.88
44.06	10.06
$Na_2C_{20}H_{12}O_4$	
45.55	11.00
40.16	12.31
$Na_2C_{20}H_{12}O_4.4H_2O$	
37.79	11.67
34.68	11.98
$Na_2C_{20}H_{12}O_4.8H_2O$	
38.42	9.97
33.72	10.17
$Na_3C_{20}H_{11}O_4.14H_2O$	
31.00	10.24
27.89	10.37
25.03	11.34
23.28	12.69
$Na_3C_{20}H_{11}O_4.13H_2O$	
20.51	13.73
10.35	17.48
$Na_3C_{20}H_{11}O_4.12H_2O$	
9.12	19.8
4.28	20.32
1.37	23.46
0.86	25.42
$Na_3C_{20}H_{11}O_4.6H_2O$	
0.11	27.01
0.0	28.03
0.0	30.74
0.23	37.44
$Na_3C_{20}H_{11}O_4.6H_2O$ + $NaOH.H_2O$	
0.00	39.88

Casein

C = NaCl

t = room (110)

g B/l (A + B)	Mol C/l (A + B)
Casein	
0.64	0.0365
1.43	0.0690
1.86	0.0794
2.48	0.0922
2.68	0.0925
2.87	0.1019
3.24	0.1064
3.46	0.1114
3.44	0.1213
3.37	0.1231
3.11	0.1265
2.97	0.1311
2.82	0.1362
2.52	0.1469
2.09	0.1568
1.87	0.1605
1.65	0.1748
1.55	0.1853
1.50	0.2023
1.40	0.2284
1.39	0.2340
1.32	0.2725

H_3BO_3

C = Alkaloids (9)

$Na_2Sb_2O_6.6H_2O$

C = $NaC_2H_3O_2$

Acetate (145)

$t°$	mg B/l soln.		
	1 % C*	2.5 % C*	5 % C*
18.0	61	31	Tr.
25.0	146	40	Tr.
33.5	205	94	4.2

* Expressed as wt. % aqueous Na acetate.

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(For a key to the periodicals see end of volume)

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(100) Osaka and Hara, *429*, **2**: 147; 17. (101) Paul, *9*, **23**: 65; 17. (102) Pellini, *22*, **19**: 329; 10. (103) Pierrat, *34*, **172**: 1041; 21. (104) Piña de Rubies, *149*, **38**: 414; 14. (105) Pucher and Dehn, *1*, **43**: 1753; 21. (106) Riesenfeld and Feld, *93*, **116**: 213; 21. (107) Ritzel, *94*, **49**: 152; 11. (108) Rivett and Rosenblum, *83*, **9**: 297; 14. (109) Rózsa, *9*, **17**: 934; 11.

(110) Ryd, *9*, **23**: 19; 17. (111) Saillard, *Bulletin technique et chimique syndicat des Fabricants de Sucre de France*, No. **5**: 30; 23. (112) Sakabe, *429*, **1**: 57; 14. (113) Scheibler, *25*, **24**: 434; 91. (114) Scholtz, *293*, **250**: 418; 12. (115) Schoorl, *70*, **42**: 790; 22. (116) Schreinemakers, *7*, **25**: 543; 98. (117) Schreinemakers, *7*, **26**: 237; 98. (118) Schreinemakers, *18*, **15**: 80; 10. (119) Schreinemakers, *176*, **7**: 211; 10.

(120) Schreinemakers and de Baat, *64P*, **17**: 1111; 15. (121) Schreinemakers and Deuss, *7*, **79**: 554; 12. (122) Schreinemakers and van den Bos, *7*, **79**: 551; 12. (123) Schryver, *5B*, **83**: 96; 10. (124) Seidell, *464*, **67**: 10; 10. (125) Seidell, *11*, **48**: 453; 12. *172*, **17**: 85; 12. (126) Sidersky, *478*, **39**: 167; 21. (127) Sidgwick, *182*, **26**: 60; 10. (128) Sidgwick and Spurrel, *4*, **117**: 1399; 20. (129) Smits and Kettner, *64P*, **15**: 683; 12.

(130) Stepanov, *13*, **373**: 219; 10. (131) Svehla, *25*, **56**: 331; 23. (132) Sziszkovski, *147*, **2**: No. 41; 13. (133) Sziszkovski, *147*, **3**: No. 5; 14. (134) Tanret, *27*, **15**: 613; 14. (135) Taylor and Rinkenbach, *1*, **45**: 44; 23. (136) Thin and Cumming, *4*, **107**: 361; 15. (137) Thomas and Yu, *1*, **45**: 113; 23. (138) du Toit, *64P*, **16**: 555; 12. (139) Tomula, *93*, **118**: 81; 21.

(140) Tyrer, *182*, **27**: 142; 11. (141) Wark, *4*, **123**: 1826; 23. (142) Wibaut, *70*, **32**: 244; 12. (143) Wirth, *93*, **87**: 7; 14. (144) Woudstra, *172*, **22**: 251; 12. (145) Würgler, *Diss.*, Zürich, 1914. *10*, **4**: 810; 22. (146) Matsuura, *41B*, **2**: 44; 27.

FREEZING-POINT—SOLUBILITY DATA FOR NON-METALLIC SYSTEMS CONTAINING MORE THAN THREE COMPONENTS*

F. C. Kracek

AQUEOUS SYSTEMS

A = H_2O; Standard arrangement; for abbreviations, *v.* p. 4

B = HCl; C = $C_{10}H_8$, Naphthalene; D = $C_{16}H_{11}N_3O_7$, Naphthalene picrate; E = KCl; F = $KC_6H_2N_3O_7$, Picrate; 20.1°C (2).

B = HCl; C_1 = $C_6H_4O_2$, Quinone; C_2 = $C_6H_6O_2$, 1, 4-Dihydroxybenzene; C_3 = $C_{12}H_{10}O_4$, Quinhydrone; D = NaCl. Solubility of C in A + B + D at 18.1°C (30).

B = HCl; C = $C_6H_3N_3O_7$, Picric acid; D = KCl; E = $KC_6H_2N_3O_7$, Picrate. One point at 20.1°C (2).

B = HCl; C = C_6H_8ClN, Aniline hydrochloride; D = $FeCl_3$. Approximate values of solubility of $FeCl_3.6(C_6H_8ClN)$ and $FeCl_3.2(C_6H_8ClN)$ in aqueous solutions of 5 to 22% HCl at 25° (23).

B = $HClO_4$; C = C_2H_6O, Ethyl alcohol; D = $KClO_4$. Solubility of $KClO_4$ in 93–98% alcohol solutions containing small amounts of $HClO_4$ (31).

B = I_2; C = C_2H_6O, Ethyl alcohol; D = KI (24)
R = Wt. ratio A/C; t = 25°C

Wt. % D	Wt. % B, R = 40/60	Wt. % B, R = 60/40
	I_2	
0	23.05	3.0
2.5	29.9	10.1
5	36.7	17.4
7.5	43.4	24.9
10.0	49.8	32.6
12.5	56.2	40.5
15.0	62.5	49.1
17.5	68.5	58.9
20.0		71.2
	$I_2 + KI_n$	
19.55	73.3	
20.55		74.8
	KI_n	
20.0	72.4	
21	70.2	74.0
22	67.4	72.1
23	64.1	70.0
24	60.4	67.6
25		65.2
26		62.7
27		60.1
28		57.4
	KI_n + KI	
24.5	58.6	
28.3		56.7
	KI	
25	51.2	
26	37.9	
27	26.8	
28	18.0	
29	10.7	53.1

B = I_2; C = C_2H_6O; D = KI.—(*Continued*)

Wt. % D	Wt. % B; Solid phase = KI, R = 40/60	R = 60/40
30	4.7	48.3
30.9	0	
32.5		36.4
35		25.3
37.5		15.3
40		6.5
42.1		0

B = H_2SO_4; C = HNO_3; D = $C_7H_5N_3O_6$, "TNT." Solubility of TNT. in mixed acids at 25°C (21).

B = H_2SO_4 (conc.); C = C_2H_6O, Ethyl alcohol (absolute); D_1 = $(NH_4)_2Ga_2(SO_4)_2.24H_2O$; D_2 = $Cs_2Ga_2(SO_4)_2.24H_2O$ (5)

Solvent, cm³ A	B	C	g D/100 cm³ soln. D_1	D_2
		t = 25°C; solid phase = D		
100	0	0	30.84	1.51
50	0	50	0.0217	0.00387
30	0	70	0.00875	0.00356
35	15	50	0.1613	0.0228

B = H_2SO_4; C = C_6H_6O, Phenol; D = C_5H_5N, Pyridine
$L_I + L_{II}$; room temperature (16)

Equiv./l......	B	9.63	9.63	9.63	9.63
	D	0	0.25	0.5	1.0
g/l in H_2O layer	C	20.4	177	615	>1008

B = NH_3; C = C_2H_6O, Ethyl alcohol; D = Cu (resp. Cd; Ni) ammonium complex (12).

B = HNO_3; C = C_3H_6O, Acetone; D = $Bi(NO_3)_3$ (6)

M B/l	% C	M D/l	M B/l	% C	M D/l
		$Bi(NO_3)_3$; t = ?			
0.922	0	2.23	2.3	0	2.04
0.922	6.67	2.17	2.3	16.7	1.89
0.922	13.3	2.08			

B = NH_4NO_3; C = $(NH_4)_2SO_4$; D = C_2H_6O, Ethyl alcohol; at 30°C (32).

B = NH_4NO_3; C = CH_4O, Methyl alcohol; D = C_2H_6O, Ethyl alcohol (27)
R = Wt. ratio C/D = 51.7/48.4; t = 30°C; solid phase = NH_4NO_3

Wt. % A	B	R	Wt. % A	B	R
29.9	70.1	0	23.2	46.2	30.6
27.3	62.8	9.9	22.9	43.8	33.3
27.0	61.2	11.8	16.4	26.0	57.6
26.0	58.6	15.4	11.5	17.8	71.7
24.8	52.1	23.1	3.4	11.7	84.9

* Except aqueous solutions containing only strong electrolytes (for which *v.* p. 270) and except systems containing a refractory oxide (for which *v.* p. 83).

B = NH_4NO_3; C = C_2H_6O, Ethyl alcohol; D = $AgNO_3$ (27)
R = Wt. ratio C/A; t = 30°C

R = 41.8/58.2		R = 71.2/28.8		R = 91.3/8.7	
Wt. % B	Wt. % D	Wt. % B	Wt. % D	Wt. % B	Wt. % D
$AgNO_3$					
0	45.0	0	19.0	0	7.0
6.41	46.65	4.36	22.1	2.20	7.7
13.18	46.7	9.90	24.3	7.23	9.4*
$AgNO_3 + AgNO_3.NH_4NO_3$					
21.0	48.4	11.6	25.6	4.7	8.5
$AgNO_3.NH_4NO_3$					
22.1	46.7	20.1	18.0	5.74	6.58
29.1	37.7	27.6	14.84		
$AgNO_3.NH_4NO_3 + NH_4NO_3$					
44.9	24.9	28.9	14.65	9.7	4.30
NH_4NO_3					
49.3	12.1	28.2	6.8	9.4	2.09
53.2	0	29.0	0	9.0	0

* Metastable with respect to $AgNO_3$.

B = NH_4Cl; C = C_3H_6O, Acetone; D = $BaCl_2$ (18)

L_I, Wt. %			L_{II}, Wt. %		
B	C	D	B	C	D
$L_I + L_{II} + NH_4Cl$; 18°C					
8.67	49.3	0.67	3.06	68.7	0.13
9.63	45.4	0.88	2.58	71.7	0.09
$L_I + L_{II} + NH_4Cl + BaCl_2.2H_2O$; 18°C					
11.5	42.3	1.34	2.4	74.0	0.01
$L_I + L_{II} + BaCl_2.2H_2O$; 18°C					
10.4	42.6	1.4	2.25	74.0	0.01
10.1	43.4	1.78	2.22	71.8	0.01
10.0	43.4	1.83	2.12	66.0	0.01
$L_I + L_{II} + NH_4Cl$; 30°C					
17.5	29.0	0.0	1.5	84.4	0.0
18.0	27.4	2.1	0.9	84.7	0.1
$L_I + L_{II} + NH_4Cl + BaCl_2.2H_2O$; 30°C					
16.9	24.1	3.1	0.63	85.2	0.1

B = $(NH_4)_2SO_4$; C = C_2H_6O, Ethyl alcohol; D = $MnSO_4$ (26.5)

B = $(NH_4)_2SO_4$; C = C_2H_6O, Ethyl alcohol; D = Li_2SO_4 (26)

L_I or L_{III}, Wt. %			L_{II} or L_{IV}, Wt. %		
C	B	D	C	B	D
$L_I + L_{II} + LiNH_4SO_4$; 6.5°C					
32.05	6.89	2.67	11.33	19.57	7.13
37.37	5.19	1.95	9.21	22.17	7.64
39.41	4.70	1.52	7.59	24.68	7.30
$L_I + L_{II} + LiNH_4SO_4 + (NH_4)_2SO_4$; 6.5°C					
55.51	1.76	0.343	4.80	33.27	6.40
$L_I + L_{II} + (NH_4)_2SO_4$; 6.5°C					
53.2	2.01	0.348	5.0	33.3	5.56
43.5	4.49	0.379	8.2	31.4	2.68
$L_I + LiNH_4SO_4$; 30°C					
0	19.6	16.3			
8.84	13.7	11.9			
16.7	11.0	9.09			
23.5	8.23	7.08			
36.9	3.93	3.38			
45.6	2.35	1.96			
70.1	0.18	0.15			
83.8	0.026	0.22			
$L_I + L_{II} + (NH_4)_2SO_4$; 30°C					
57.0	2.3	0	5.7	37.5	0
63.5	1.13	0.09	3.82	37.3	3.21
66.9	0.82	0.11	3.47	37.2	5.01
$L_I + L_{II} + (NH_4)_2SO_4 + LiNH_4SO_4$; 30°C					
67.4	0.72	0.12	3.45	35.8	5.69

B = $(NH_4)_2SO_4$; C = C_2H_6O; D = Li_2SO_4.—(*Continued*)

L_I or L_{III}, Wt. %			L_{II} or L_{IV}, Wt. %		
C	B	D	C	B	D
$L_I + L_{II} + LiNH_4SO_4$; 30°C					
65.9	0.76	0.14	3.79	34.6	5.9
49.5	2.34	1.07	7.29	21.7	8.7
48.9	2.36	1.09	7.37	21.6	8.8
39.1	3.88	2.61	10.97	15.6	9.4
35.1	4.66	3.51	13.0	13.5	9.2
$L_{III} + L_{IV} + LiNH_4SO_4$; 30°C					
33.95	2.93	6.24	16.3	6.8	12.8
$L_{III} + L_{IV} + LiNH_4SO_4 + Li_2SO_4.H_2O$; 30°C					
39.3	1.96	5.03	12.94	7.1	14.8
$L_{III} + L_{IV} + Li_2SO_4.H_2O$; 30°C					
31.0	3.02	8.63	20.2	4.87	12.0
$L_I + LiNH_4SO_4$; 50°C			$L_{II} + LiNH_4SO_4$; 50°C		
47.3	2.08	1.7	0	19.7	16.4
56.4	0.94	0.76	6.0	16.0	13.2
76.3	0.058	0.047	9.5	14.1	11.6
$L_I + L_{II} + (NH_4)_2SO_4$; 50°C					
64.5	1.2	0	4.1	41.1	0
66.9	0.85	0.019	3.66	40.4	2.16
$L_I + L_{II} + (NH_4)_2SO_4 + LiNH_4SO_4$; 50°C					
69.5	0.54	0.065	3.06	39.9	5.12
$L_I + L_{II} + LiNH_4SO_4$; 50°C (At this temperature the two immiscible areas present at 30°C have merged into one)					
53.5	1.91	0.804	6.21	23.9	8.85
48.0	2.48	1.47	8.08	18.9	9.85
42.2	3.02	2.83	11.0	13.7	10.4
41.2	2.53	3.69	11.7	10.4	12.9
42.9	2.08	3.54	10.9	10.1	14.0
45.7	1.53	3.31	9.9	9.3	15.6
$L_I + L_{II} + Li_2SO_4$; 50°C					
33.4	2.3	6.8	17.8	5.8	12.5

B = H_3PO_4; C = $C_6H_8O_7$, Citric acid; D = NaOH (25)
Concentrations in millimol/liter

B	C	D	B	C	D
$Na_2HPO_4.12H_2O$; 20°C			$NaH_2C_6H_5O_7.H_2O$; 20°C		
556	0	1112	542	1105	525
564	167.4	1128	3035	1156	7496
1570	343	3140	1370	1293	1762
1553	371	3106	894	1485	1437
2142	526	4284	1415	1603	1562
$C_6H_8O_7.H_2O$; 20°C			768	1675	2129
566	4070	1131	781	2035	2124
136	4010	272	1010	2216	1423
85.3	3913	171	745	2769	3646
0	3816	0	657	2958	1275
			422	3548	1615

B = CH_4O, Methyl alcohol; C = C_2H_6O, Ethyl alcohol; D = KF. Solubility of KF in aqueous mixtures of methyl and ethyl alcohols at room temp. Two liquid phases (15).

B = CH_4O, Methyl alcohol; C = C_2H_6O, Ethyl alcohol; D = KNO_3 (27)
R = Wt. ratio B/C = 51.7/48.3; t = 30°C; solid phase = KNO_3

Wt. %			Wt. %		
A	R	D	A	R	D
68.7	0	31.3	47.1	47.8	5.1
68.4	12.7	18.9	40.1	56.4	3.5
64.3	22.9	12.8	24.0	74.8	1.2
52.3	41.0	6.7			

B = CH_4O, Methyl alcohol; C = C_3H_6O, Acetone; D = KF
Critical solutions; t = 20°C (14)

L_I, Wt. %			L_I, Wt. %		
B	C	D	B	C	D
$L_I + L_{II}$					
0.14	1.08	32.6	22.0	10.4	16.4
0.68	5.25	20.2	22.7	40.4	3.03
1.40	9.90	16.13	23.9	36.2	4.0
1.46	11.40	14.69	25.3	31.6	5.2
2.19	17.02	11.43	25.8	46.3	2.10
2.45	17.3	11.2	26.8	25.7	7.33
2.79	21.6	9.5	28.0	41.3	2.75
3.50	27.1	7.6	28.4	18.3	10.7
3.51	24.8	8.6	29.0	13.8	13.8
4.0	28.7	7.5	29.7	11.1	14.6
8.55	55.3	1.93	30.1	36.1	3.65
8.96	52.8	2.42	31.3	33.0	4.46
9.96	46.0	4.21	32.5	29.6	5.30
10.3	43.7	4.97	35.2	20.8	8.9
10.6	41.4	5.8	42.8	19.4	9.3
10.8	39.2	7.0	33.9	53.0	1.72
15.0	9.2	15.9	35.4	37.9	3.10
15.5	45.9	2.43	37.3	33.9	4.05
16.8	40.6	3.37	39.5	29.0	5.16
17.5	37.4	4.12	42.0	22.3	7.62
20.8	20.9	9.75	44.7	7.9	17.7

B = $C_2H_4O_2$, Acetic acid; C = $CaC_4H_4O_6$, Tartrate; D = $KC_2H_3O_2$, Acetate. Solubilities of Ca tartrate at 25°C (17).

B = C_2H_6O, Ethyl alcohol; C = $C_5H_{12}O$, n-Amyl alcohol; D = NaCl (13)

L_I, Wt. %			L_{II}, Wt. %		
B	C	D	B	C	D
$L_I + L_{II}$; 28°C					
16.9	77.3	0.2	6.0	0.6	15.9
26.3	59.7	0.4	12.6	1.2	10.0
29.0	56.6	0.6	11.0	1.0	14.5
38.5	34.5	2.2	17.5	1.9	13.4
40.3	37.2	2.0	16.4	1.4	15.3
$L_I + L_{II}$ + NaCl; 28°C					
0	95.4	0.5	0	0.22	26.35
9.5	86.6	0.10	1.9	0.25	25.3
19.1	75.4	0.25	4.5	0.3	24.0
30.9	59.9	0.58	6.9	0.4	22.6
38.7	47.0	1.23	10.3	0.5	21.2
44.8	31.6	2.81	15.2	1.3	19.3
41.5	17.7	6.56	22.1	3.6	15.8
32.5	10.0	11.0 crit.	32.5	10.0	11.0 crit.
L, Wt. %			L, Wt. %		
L + NaCl; 28°C					
55.18	38.42	0.15	56.48	10.35	3.98
41.16	48.84	0.36	55.77	11.41	3.97
66.42	19.79	0.69	51.31	4.60	6.49
52.41	32.03	0.96	38.54	13.58	8.26
65.12	8.80	2.39	36.54	8.65	9.95
53.86	23.08	2.13	29.35	5.29	13.0

B = C_2H_6O, Ethyl alcohol; C = $C_7H_6O_2$, Benzoic acid; D = $C_7H_9NO_2$, Ammonium benzoate (26.5).

B = C_2H_6O, Ethyl alcohol; C = $AgNO_3$; D = KNO_3 (27)
t = 30°C; Wt. ratio B/A = 51.6/48.4

Wt. %		Solid phase	Wt. %		Solid phase
C	D		C	D	
37.0	0	C	16.5	4.11	D
36.9	2.62	C + CD	5.15	4.55	D
21.3	4.26	D + CD	0	4.8	D

B = C_2H_6O, Ethyl alcohol; C = NaCl; D = Na_2SO_4 (28, 29)

Wt. % B	Wt. % D	Wt. % C
$Na_2SO_4.10H_2O$ + NaCl; 15°C		
0	5.64	23.39
7.13	3.5	20.8
8.81	3.47	20.25
$Na_2SO_4.10H_2O$ + Na_2SO_4 + NaCl; 15°C		
9.78	2.96	19.94
Na_2SO_4 + NaCl; 15°C		
10.11	2.92	19.76
13.69	2.06	18.63
15.35	1.78	17.98
24.77	0.85	14.93
45.42	0.15	8.48
73.86	0.008	2.05
$Na_2SO_4.10H_2O$ + Na_2SO_4; 15°C		
21.45	1.25	14.79
30.91	0.68	11.41
41.90	0.23	7.65
57.64	0.03	2.67
72.0	0.03	0
Na_2SO_4; 15°C		
43.25	0.22	8.24
61.87	0.03	2.79
$Na_2SO_4.10H_2O$ + Na_2SO_4; 25°C		
0	15.22	13.78
6.24	10.10	11.82
11.84	6.41	10.42
20.33	3.26	7.95
29.44	1.51	5.40
37.62	0.69	3.35
53.0	0.4	0
Na_2SO_4 + NaCl; 25°C		
0	6.85	22.85
10.69	2.41	19.97
19.09	1.26	17.11
21.03	1.07	16.46
31.03	0.57	13.20
37.62	0.34	11.48
37.88	0.34	11.12
57.30	0.005	5.88
72.68	0	2.52
Na_2SO_4; 25°C		
36.96	0.60	4.79
20.93	2.53	9.35
Na_2SO_4 + NaCl; 35°C		
0	6.14	23.44
9.88	2.34	20.57
17.72	1.30	17.86
28.35	0.67	14.35
36.12	0.45	12.08
55.52	0.056	6.05
79.94	0.019	1.39

B = C_2H_6O, Ethyl alcohol; C = NaCl; D = Na_2CO_3 (3)

L_I, Wt. %			L_{II}, Wt. %		
B	C	D	B	C	D
$L_I + L_{II}$ + $Na_2CO_3.10H_2O$; 30°C					
44.8	0	1.38	3.41	0	26.14
48.5	1.01	1.21	2.93	1.15	26.38
$L_I + L_{II}$ + $Na_2CO_3.10H_2O$ + $Na_2CO_3.7H_2O$; 30°C					
50.65	1.39	1.0	3.59	1.63	25.5
$L_I + L_{II}$ + $Na_2CO_3.7H_2O$; 30°C					
53.2	3.07	0.61	3.07	5.14	24.0
$L_I + L_{II}$ + $Na_2CO_3.7H_2O$ + $Na_2CO_3.H_2O$; 30°C					
54.92	4.03	0.59	4.79	6.51	19.45

B = C_2H_6O; C = NaCl; D = Na_2CO_3.—(*Continued*)

L_I, Wt. %			L_{II}, Wt. %		
B	C	D	B	C	D
$L_I + L_{II} + Na_2CO_3.H_2O$; 30°C					
52.15	4.62	0.56	4.89	7.16	19.21
43.5	6.78	1.41	7.31	9.02	16.42
34.6	8.42	3.39	12.29	10.81	12.11
25.7	10.32	5.60 crit.	25.74	10.32	5.60 crit.
L_I, Wt. %			L_I, Wt. %		
$L_I + L_{II}$ (no solid phase); 30°C					
23.14	9.04	6.69 crit.	16.10	0	10.84 crit.
18.94	3.29	8.62 crit.			
L + $Na_2CO_3.10H_2O$ + $Na_2CO_3.7H_2O$; 30°C					
2.52	1.85	25.9	51.7	1.30	0.66
L + $Na_2CO_3.7H_2O$ + $Na_2CO_3.H_2O$; 30°C					
4.15	7.20	19.5	64.7	1.72	0.36
59.3	2.83	0.44			
L + $Na_2CO_3.H_2O$ + NaCl; 30°C					
0	14.13	18.0	42.0	9.3	1.08
9.06	15.47	10.1	61.8	4.63	0.41
21.0	13.9	6.02			
L + $Na_2CO_3.H_2O$; 30°C					
69.23	3.03	?	84.9	0.89	
78.1	1.18		94.4	0.19	

B = C_2H_6O, Ethyl alcohol; C = NaBr; D = Na_2CO_3 (3)

L_I, Wt. %			L_{II}, Wt. %		
B	C	D	B	C	D
$L_I + L_{II}$ (critical curve) [no solid phase]; 30°C					
15.6	6.82	10.6			
15.9	3.34	10.7			
16.1	0	10.8			
$L_I + L_{II} + Na_2CO_3.10H_2O$; 30°C					
44.81	0	1.38	3.41	0	26.1
41.8	2.20	1.62	3.06	1.02	25.7
37.7	5.00	2.02	3.69	2.93	24.6
36.7	5.47	2.11	3.70	3.84	24.2
$L_I + L_{II} + Na_2CO_3.10H_2O + Na_2CO_3.7H_2O$; 30°C					
34.4	6.66	2.65	3.78	4.67	22.9
$L_I + L_{II} + Na_2CO_3.7H_2O$; 30°C					
33.1	7.45	2.72	4.02	4.96	22.8
29.7	8.9	3.64	5.47	6.51	21.0
22.7	10.0	6.3	8.15	8.52	17.1
15.2	10.8	10.4 crit.			
L_I, Wt. %			L_I, Wt. %		
L + $Na_2CO_3.10H_2O$ + $Na_2CO_3.7H_2O$; 30°C					
2.58	4.82	24.4	46.3	3.79	0.82
39.4	5.98	1.42	55.7	0	0.53
L + $Na_2CO_3.7H_2O$ + $Na_2CO_3.H_2O$; 30°C					
10.3	17.2	11.0	49.2	11.5	0.39
21.2	16.9	5.27	62.8	6.09	0.26
34.6	15.3	1.33	73.1	0	0.11
L + $Na_2CO_3.H_2O$ + Na_2CO_3; 30°C					
73.7	10.12	?*	84.3	5.26	?
L + $Na_2CO_3.H_2O$ + $NaBr.2H_2O$; 30°C					
8.23	42.7	1.15	21.05	36.9	0.41
14.21	39.8	0.69	27.8	33.9	0.23
L + $Na_2CO_3.H_2O$; 30°C					
20.7	36.3	0.54	52.0	21.7	?
40.6	26.9	?*			
L + Na_2CO_3; 30°C					
59.3	18.5	?*	78.2	10.0	?
L + $Na_2CO_3.H_2O$ + Na_2CO_3 + $NaBr.2H_2O$; 30°C					
54.7	21.0				

* Na_2CO_3 concentration negligibly small.

B = C_2H_6O, Ethyl alcohol; C = NaI; D = Na_2CO_3 (3)

L_I, Wt. %			L_{II}, Wt. %		
B	C	D	B	C	D
$L_I + L_{II}$ (critical curve); 30°C					
16.1	0	10.84			
16.5	3.01	10.91			
13.86	5.35	11.4			
11.62	8.02	13.4			
9.56	9.47	16.3			
$L_I + L_{II} + Na_2CO_3.10H_2O$; 30°C					
41.75	3.98	1.41	2.47	0.67	25.53
29.7	8.67	3.47	3.60	4.80	23.28
24.9	9.75	4.75	6.06	7.91	21.27
22.1	10.54	5.63	9.52	9.20	17.73
9.56	9.47	16.26 crit.			
L_I, Wt. %			L_I, Wt. %		
L + $Na_2CO_3.10H_2O$ + $Na_2CO_3.7H_2O$; 30°C					
0	9.3	24.3	29.59	11.1	2.49
9.04	11.4	14.5	48.86	4.62	0.47
19.31	12.1	6.61	55.70	0	0.43
L + $Na_2CO_3.7H_2O$ + $Na_2CO_3.H_2O$; 30°C					
0	25.4	15.3	36.4	19.4	0.74
10.5	27.1	6.61	55.1	9.8	0.40
21.1	25.3	3.00	73.1	0	0.11
L + $Na_2CO_3.H_2O$ + Na_2CO_3; 30°C					
41.6	37.4	?*	20.0	51.5	
64.0	22.8				
L + Na_2CO_3 + $NaI.2H_2O$; 30°C					
48.3	40.4	?*	31.0	47.2	
L + $Na_2CO_3.H_2O$ + Na_2CO_3 + $NaI.2H_2O$; 30°C					
4.99	61.6	?*			

* Na_2CO_3 concentration negligibly small.

B = C_2H_6O, Ethyl alcohol; C_1 = KOH; C_2 = KCl; D = K_2CO_3; at 30°C (32).

B = C_3H_6O, Acetone; C = $CuCl_2$; D = NaCl (18)

L_I, Wt. %			L_{II}, Wt. %		
B	C	D	B	C	D
$L_I + L_{II}$ + NaCl; 30°C					
19.00	0	18.50	84.2	0	0.41
20.20	3.3	16.60	80.85	1.55	1.66
22.65	10.7	12.10	68.20	4.43	3.55
23.10	11.2	11.53	64.10	5.07	4.03
27.50	13.4	10.60	54.60	8.26	5.60
29.90	13.8	10.55	53.50	8.40	5.40
41	12	8 crit.	41	12	8 crit.
L_I, Wt. %			L_I, Wt. %		
L + $CuCl_2.2H_2O$ + NaCl; 30°C					
0	36.86	10.25	32.5	27.95	5.90
8.8	35.60	7.45	57.7	16.40	3.72
11.9	34.70	6.70	70.7	9.60	4.00
22.9	31.00	5.94	80.6	4.67	3.50
L + NaCl; 30°C					
29.1	18.7	5.78	44.5	18.9	5.30
38.0	20.9	4.09	61.4	10.35	4.30

B = $C_3H_8O_3$, Glycerol; C = C_6H_6O, Phenol; D = $NH_4Al(SO_4)_2.12H_2O$. At *ca.* 20°C, a solution saturated with D has 18.5% B, 3.09% C and 4.43% D (10).

B = $C_3H_8O_3$, Glycerol; C = **Alkaloids**; D = H_3BO_3
Solution before saturation contains 50 g B and variable quantities of D per 100 cm³. Solubility of C in g/100 cm³ soln. [1]

C \ g D/100 cm³	3	5	7.65	15.3
Eserine, $C_{15}H_{21}N_2O_3$......	2.5			
Morphine, $C_{17}H_{19}NO_3$.....	5.5			
Cocaine, $C_{17}H_{21}NO_4$.......	8			
Atropine, $C_{17}H_{23}NO_3$......	10			
Codeine, $C_{18}H_{21}NO_3$......	4			
Quinine, $C_{20}H_{24}N_2O_2$......			20	40
Strychnine, $C_{21}H_{22}N_2O_2$...	3.5			
Veratrine, $C_{32}H_{49}NO_9$.....	6	15		

B = $C_4H_{10}O$, Ethyl ether; C = HgI_2; D = **KI** [11]

L_I, Wt. %			L_{II}, Wt. %			L_{III}, Wt. %		
B	C	D	B	C	D	B	C	D
$L_I + L_{II} + L_{III}$ (no solid phase); 20°C								
88.3*	6.2	2.1	23.4	30.8	16.7	23.4	30.8	16.7
87.9†	6.2	2.2	23.2	30.9	16.6	←just disappears→		
87.0	6.8	2.2	28.5	30.6	15.8	18.4	32.4	18.5
86.7†	6.8	2.3	33.3	29.4	14.3	←disappears→		
←disappears†→			37.7	30.1	13.2	12.8	33.0	20.3
85.4	7.7	2.7	38.7	28.7	13.1	12.9	32.9	20.5
85.4	7.5	2.7	39.4	28.8	12.5	12.9	32.6	20.8
77.5	12.8	4.1	47.7	26.6	10.3	12.4	34.2	21.9
78.2	11.2	4.5	49.1	25.9	10.3	10.7	34.5	22.2
68.9	16.6	5.8	58.0	21.9	8.8	10.1	35.9	22.4
69.2	16.8	6.0	58.6	21.6	8.7	9.8	34.7	23.0
64.3‡	19.2	7.1	64.3	19.2	7.1	10.0	35.2	22.4

L_I, Wt. %			L_{II}, Wt. %		
B	C	D	B	C	D
$L_I + L_{II}$ + $KHgI_3.H_2O$; 20°C					
76.6	14.0	5.3	0.6	51.0	36.4
44.5	33.8	14.1	1.4	51.7	33.7
32.7	39.6	17.6	2.4	50.3	32.4
23.7	42.8	19.7	2.9	49.5	31.7
9.0	47.2	26.6 crit.	9.0	47.2	26.6 crit.
$L_I + L_{II}$ + HgI_2; 20°C					
96.2	1.6	0.2	12.4	10.5	3.5
95.8	1.9	0.3	18.3	15.5	4.4
86.1	8.7	1.4	50.7	26.5	5.2
77.0	14.0	2.5	60.0	22.9	4.3
73.5	15.6	3.0	63.0	21.5	4.0
69.4	17.9	3.1	69.4	17.9	3.1
L + L_{II} + KI + $KHgI_3$; 20°C					
94.7	3.0	1.2	0.6	51.1	38.5
$L_I + L_{II}$ + KI; 20°C					
99.2	*ca.* 0	0.4	3.7	*ca.* 0	55.6
$L_I + L_{II}$ + HgI_2 + $KHgI_3$; 20°C					
93.8	4.3	1.1	←disappears→		
95.4	3.2	1.0	28.8	54.3	15.6
←disappears→			24.8	58.2	17.0

L_I, Wt. %			L_I, Wt. %		
L_I + HgI_2 + $KHgI_3.H_2O$; 20°C					
0	50.3	26.7	45.1	41.0	9.5
9.4	50.7	22.1	52.6	34.6	8.6
19.1	50.1	17.0	73.8	19.2	4.5
35.4	46.0	12.1	84.6	12.0	1.5
39.0	44.0	11.2			

* Critical concentration, $L_{II} = L_{III}$.
† Phase disappears without necessarily becoming identical with another phase; not a critical point. ‡ Critical concentration, $L_I = L_{II}$.

B = C_6H_6O, Phenol; C = C_7H_8O, *o-* + *m-* + *p*-Cresols [4, 22].
For temperatures of formation of two liquid phases in mixtures of phenol with aqueous solutions of various organic and inorganic compounds, *v.* [7, 8, 9].

B = $C_2H_3ClO_2$, Chloroacetic acid; C = $CaC_4H_4O_6$, Tartrate; D = $KC_2H_2ClO_2$, Chloroacetate. Solubilities of Ca tartrate at 25°C [17].

B = $CaC_4H_4O_6$, Tartrate; C = **KCl**; D = $KC_2H_3O_2$, Acetate. Solubilities of Ca tartrate at 25°C [17].

NON-AQUEOUS SYSTEMS

$C_2H_4O_2$

Acetic acid

B = $C_4H_6O_3$, Acetic anhydride, C = C_7H_7NO, Benzamide; D = $C_9H_9NO_2$, Acetylbenzoylimide [19]
Mixtures consist of *x* M % of 1:1 (A + D) with 100-*x* M % 1:1 (B + C)

x %	°C ± 1°	*x* %	°C ± 1°
Solid C		Solid D	
0	90	40	*ca.* 50
10	86	50	58
20	78	60	66
30	66	70	72
35	58	80	77
39	*ca.* 50	90	81
		100	84

B = $C_4H_6O_3$, Acetic anhydride; C = C_7H_5N, Benzonitrile; D = C_7H_7NO, Benzamide; E = $C_9H_9NO_2$, Acetylbenzoylimide [19]. *See* Figure, p. 429.

C_2H_3N

Acetonitrile

B = $C_2H_4O_2$, Acetic acid; C = C_2H_5NO, Acetamide; D = $C_4H_6O_3$, Acetic anhydride [20]
Mixtures consist of *x* M % of 1:1 (A + B) with 100-*x* M % 1:1 (C + D)

x %	°C ± 1°	*x* %	°C ± 1°	*x* %	°C ± 1°
Solid C		Solid BC_2 (?)		Solid B	
0	50	*ca.* 32	−22	*ca.* 58	−29.5
10	37	35	−21.5	60	−26.5
20	+18	40	−22	70	−14.5
30	−14	50	−25	80	−6
ca. 32	−22	*ca.* 58	−29.5	90	−0.5
				100	+2.5

LITERATURE

(For a key to the periodicals see end of volume)

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(10) Dunlop, *347*, **85**: 6; 10. (11) Dunningham, *4*, **105**: 724, 2623; 14. (12) Ephraim and Mosimann, *25*, **55**: 1608; 22. (13) Fontein, *7*, **73**: 212; 10. (14) Frankforter and Cohen, *1*, **36**: 1103; 14. **38**: 1136; 16. (15) Frankforter and Frary, *50*, **17**: 402; 13. (16) Hatcher and Skirrow, *1*, **39**: 1939; 17. (17) Henderson and Taylor, *50*, **20**: 663; 16. (18) Jacobs, *Diss.*, Leiden, 1914. (19) Kremann, Rösler and Penkner, *57*, **43**: 145; 22.

(20) Kremann, Zoff and Oswald, *57*, **43**: 139; 22. (21) McHutchison and Wright, *54*, **34**: 781T; 15. (22) Masse and Leroux, *27*, **21**: 2; 17. (23) Osaka, Shima and Yoshida, *429*, **7**: 69; 24. (24) Parsons and Corliss, *1*, **32**: 1367; 10. (25) Pratolongo, *22*, **22 I**: 387; 13. (26) Schreinemakers, *7*, **59**: 641; 07. (26.5) Schreinemakers, *64P*, **10**: 817; 08. (27) Schreinemakers, *7*, **65**: 553; 09. (28) Schreinemakers, *18*, **15**: 80; 10. (29) Schreinemakers and de Baat, *7*, **67**: 551; 09.

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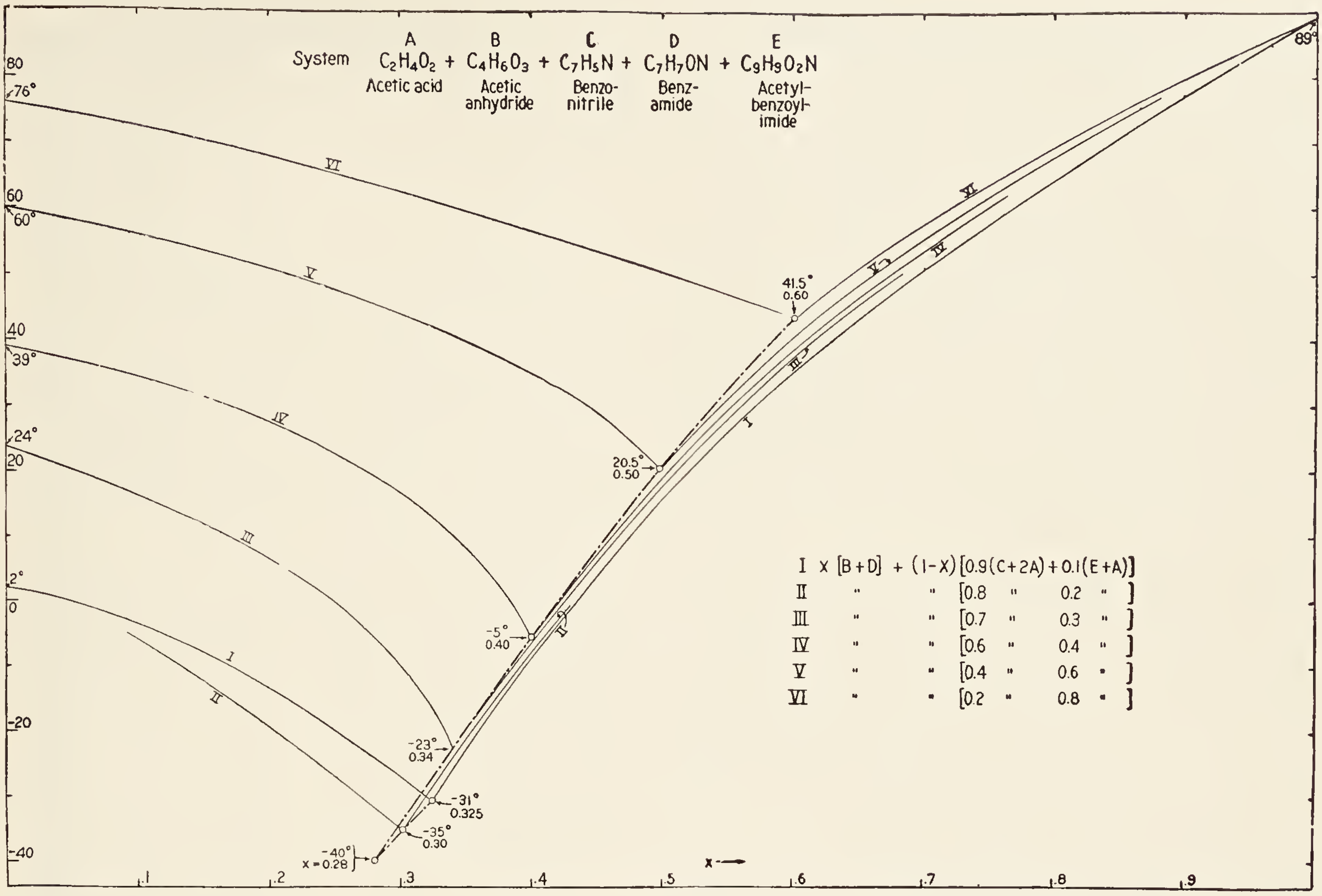

OSMOTIC PRESSURE

W. E. Garner

In this section are included data on osmotic pressure obtained by direct measurement. With few exceptions, only those pressures are given which are generated by solutions of pure substances when separated from the pure solvent by a semipermeable membrane. Where appreciable amounts of diffusion have occurred or the solution is not opposed by the pure solvent, this is indicated in the tables. Wherever possible the pressures are expressed in normal atmospheres and the concentrations of the solutions in gram formula weights per 1000 g of the solvent (M/1000) in terms of the table of atomic weights, Vol. I, p. 43. Where the pressures measured are small they are given in mm Hg. Values are given to the last significant figure for which *relative* accuracy can be claimed.

SOLUTIONS IN WATER MAINLY WITH COPPER FERROCYANIDE MEMBRANES

$C_{12}H_{22}O_{11}$, Sucrose, 342.2, $P_{osm.}$ in Atm. (41)

M/1000 \ °C	0	5	10	15	20	25	30	40	50	60	70	80
0.1	(2.48)	2.47	2.52	2.56	2.61	2.65	2.50	2.58	2.66	2.74		
0.2	4.76	4.86	4.93	5.03	5.11	5.19	5.09	5.21	5.32	5.48		
0.3	7.14	7.26	7.39	7.54	7.67	7.79	7.71	7.91	8.04	8.21		
0.4	9.52	9.69	9.87	10.03	10.22	10.38	10.38	10.69	10.81	10.96		
0.5	12.00	12.20	12.40	12.65	12.86	13.05	13.09	13.47	13.62	13.78	14.11	
0.6	14.50	14.73	14.98	15.27	15.52	15.76	15.85	16.28	16.46	16.67	16.96	
0.7	17.03	17.35	17.65	17.97	18.29	18.59	18.66	19.10	19.37	19.57	19.74	
0.8	19.65	19.99	20.34	20.72	21.09	21.44	21.56	21.99	22.31	22.52	22.76	23.26
0.9	22.32	22.68	23.09	23.51	23.93	24.34	24.44	24.95	25.35	25.50	25.79	26.14
1.0	25.05	25.51	25.92	26.42	26.87	27.29	27.47	27.94	28.46	28.63	28.87	29.07

$C_{12}H_{22}O_{11}$, 342.2, $P_{osm.}$ IN ATM.—(*Continued*)

M/1000	0.1	0.3	0.6	1.0	2.0	3.0	4.0	5.0	6.0	Supersatd.
0°C (7)	2.25	6.91	14.22	24.76	54.9	90.0	129.7			
30°C (23, 35)					58.6	95.8	141.2	193		268.8
57.7°C (23, 35)					62.5	101.5	145.4	195.9	248	

$C_6H_{12}O_6$, GLUCOSE, 180.09, $P_{osm.}$ IN ATM. (39, 40)

M/1000 \ °C	0	10	23	M/1000 \ °C	0	10	23
0.1	2.42	2.41	2.41	0.6	14.13*	14.43	14.5
.2	4.69	4.80	4.79	.7	16.51	16.84	17.0
.3	7.07	7.17	7.21	.8	18.92	19.20	19.4
.4	9.38	9.60	9.64	.9	21.42	21.56	21.8
.5	11.75	12.01	12.14	1.0	23.78*	23.99	24.3

* Berkeley and Hartley's data (*v.infra*) give 13.4 and 22.9, resp.

$C_6H_{11}O_6CH_3$, α-METHYL GLUCOSIDE (7)

M/1000........	1	2	3	4
Atm., 0°C......	25.0	53.8	86.4	120.2

$C_6H_{12}O_6$, GALACTOSE (6)

g/l....................	250	380	500
Atm., 0°C.............	35.5	62.8	95.8

$C_6H_{12}O_6$, GLUCOSE (6)

g/l.................	99.8	199.5	319.2	448.6	548.6
Atm., 0°C...........	13.2	29.2	53.2	87.9	121.2

$C_6H_{14}O_6$, MANNITOL (6)

g/l....................	100	110	125
Atm., 0°C	13.1	14.6	16.7

$C_6H_{14}O_6$, Isodulcitol, M/1000 = 2, $P_{osm.}$ (0°C) = 54.8 atm. (7).

C_6H_6O, PHENOL, 94.06, 30°C (24)

M/1000.........	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
P_{osm}...........	1.46	2.84	3.93	5.12	6.40	7.62	8.82	10.05	11.28

Substance	Formula	M/1000	t, °C	Atm.	Lit.
Amygdalin.......	$C_{20}H_{27}NO_{11}$	0.0219	0	0.474	(21)
Antipyrine.......	$C_{11}H_{12}N_2O$	0.0530	0	1.18	(21)
Resorcinol........	$C_6H_6O_2$	0.0097	11	0.207	(31)
		0.0100	16	0.206	
Saccharin........	$C_7H_5NO_3S$	0.0029	17	0.075	(31)

OSMOTIC PRESSURE OF COLLOIDS

Substance	Wt. %	t, °C	mm Hg	Lit.
Dextrin..................	1	15.9	166	(43)
Gum arabic............	1	15.2	69	(43)
	6	15.5	259	
	18	15.6	1193	
Egg albumen............	1.25	room	22.4	(50)
Gelatin..................	1.5	room	8.2	(50)
Horse hemoglobin.........	5.27	room	58.75	(50)
Cow hemoglobin..........	10.8	room	109.0	(50)
Sodium caseinogenate.....	3.23	25	313	(5)
	8.0*	11	334	(38)
Hemoglobins............				(1)

* Solutions nearly neutral.

GELATIN, t = 20°; COLLODION MEMBRANE (11)

Gelatin	Wt. %	mm Hg
Dhéré and Gorgolewski.................	0.152	1.00
Sadikoff................................	0.169	2.30
Moerner................................	0.232	7.9

GELATIN.—(*Continued*)

Gelatin	Wt. %	mm Hg
Faust................................	0.17	2.28
Dryplate Sleussner....................	0.17	2.86
Technical 1..........................	0.174	1.61
2..........................	0.157	2.07
3..........................	0.145	3.07
4..........................	0.123	3.16
5..........................	0.118	3.58

β-DEXTRIN, t = 25°; COLLODION MEMBRANE (13)
Solubility 1.76% at 22°

Wt. %..........	0.0452	0.0818	0.158	0.321	0.513
mm Hg.........	5.70	8.24	12.7	15.8	18.7

DEXTRIN (KAHLBAUM PURIFIED), t = 25°; COLLODION MEMBRANE (14)

Wt. %.......	0.076	0.125	0.268	0.445	0.663	1.02	1.675
mm Hg......	3.47	5.75	8.1	10.4	12.3	13.1	15.0

For other dextrins, *see* (38).

CONGO RED, M. W., 696.5

t = 25° (15)		t = 25° (5)		t = 17° (18)	
M/1000 l	mm Hg	M/1000 l	mm Hg	M/1000 l	mm Hg
0.306	7.07	1.12	24	4.97	88.7
0.619	13.5	2.23	45	5.13	89.0
0.907	17.3	4.46	106	6.15	106.0
1.25	27.6	8.93	176	7.05	120
1.59	33.2	17.86	326	8.10	145
1.87	42.1	35.7	625	10.05	171.7
Initially against pure water; collodion membrane.		55.6	1020	18.3	310
		71.4	1220	37.5	603
				72.0	1139
				86.6	1363
		Parchment membrane. Against pure water			

Osmotic pressure of a solution of congo red at 28.5°, 123 mm Hg; at 62°, 138 mm Hg, parchment membrane (5)

Chicago Blue, 25°; parchment..	M/1000 l	2.84	0.997	Lit.
	$P_{osm.}$ mm Hg	93	35	(5)

25°C, initially against pure water, collodion (12)

Tuchrot G. A.		Brilliantkongo		Chicago Blue 6 B		Kongorein-blau	
Wt. %	mm Hg	Wt. %	mm Hg	Wt. %	mm Hg	Wt. %	mm Hg
0.013	3.3	0.027	6.1	0.023	7.8	0.028	8.6
0.0275	6.0	0.050	15.7	0.043	14.8	0.045	15.0
0.029	7.1	0.0475	18.4	0.045	15.6	0.073	26.5
0.0325	8.5	0.063	22.8	0.066	23.2	0.087	29.2
0.082	21.3	0.076	29.9	0.078	27.3		
0.105	22.5						

For results on benzopurpurine, primuline, and commercial dyes, *see* (5) and (12). For the effect of electrolytes on the osmotic pressure of dyestuffs, *see* (5, 12, 15, 18).

$Fe_2Cl_6 \cdot 140Fe_2O_3$ IRON HYDROXIDE SOL. (19)

Wt. %..........	0.15	0.20	0.40	0.80	1.84
mm H_2O.......	2.0	5.5	20	70	220

THORIUM HYDROXIDE SOL.

Wt. %............	0.40	0.56	0.97	1.75	2.70	4.03
mm H_2O..........	2.5	13	47	115	240	430

Data are also given for copper ferrocyanide, prussian blue, gum arabic and dialyzed caramel.

Osmotic Pressure of Electrolytes with Copper Ferrocyanide Membrane

0°C [8, 9]

M/1000	Atm.
Ca ferrocyanide	
0.1024	2.54
0.2422	5.34
0.4182	9.20
0.6030	14.65
0.7470	20.33
1.075	41.22
1.353	70.84
1.469	87.09
1.617	112.84
1.711	130.66
Mg ferrocyanide	
0.2343	6.20
0.3241	8.70
K ferrocyanide	
0.0412	2.93
0.0824	5.41
0.1529	9.19
0.2416	13.52
0.3688	19.25
Na ferrocyanide	
0.0745	5.33
0.1163	7.83
0.1667	10.69
0.2305	14.23
0.2950	17.69
Sr ferrocyanide	
0.1596	3.40
0.3361	6.18
0.4642	8.59
0.6197	12.04
α-Tetramethylammonium ferrocyanide	
0.2686	5.96
2.152	52.32
K ferricyanide	
0.1215*	7.58
0.5894*	32.39
0.8509*	47.61
Ca ferricyanide	
0.0365	2.56
0.0483	3.23
0.1232	8.68
0.1863	14.33

15°C [2]

M/1000 l H_2O	Atm.
K_2SO_4	
25.0	1.09
50.0	2.01
KNO_3	
25.0	0.93
50.0	1.60
200.0	4.50
KI	
25.0	0.92
50.0	1.80
100.0	3.37

15°C [2]

M/1000 l H_2O	Atm.
$KHCO_3$	
25.0	0.63
50.0	1.17
100.0	2.03
$KClO_3$	
50.0	1.73
$KC_2H_3O_2$	
50.0	1.26
$K_2C_2O_4$	
25.0	1.31
50.0	2.26
$KHSO_3$	
25.0	0.79
$K_2C_4H_4O_6$	
25.0	1.17
50.0	2.30
$K(SbO)C_4H_4O_6$	
25.0	0.75
50.0	1.35
$KAl(SO_4)_2.12H_2O$	
12.5	1.08
25.0	2.04
$KCr(SO_4)_2.12H_2O$	
12.5	1.10
25.0	2.27
$K_4Fe(CN)_6$	
12.5	0.93
50.0	3.47
$K_6Co_2(CN)_{12}$	
12.5	1.76
25.0	3.0
K formate	
50.0	1.25
K acetate	
50.0	1.54
K propionate	
50.0	1.62
K benzoate	
50.0	1.95
K oxalate	
50.0	2.26
$NaNO_3$	
25.0	0.60
50.0	1.69
100.0	3.11
$Na_2S_2O_3$	
50.0	2.21
Na_2HPO_4	
25.0	1.50
50.0	1.82
Na citrate	
25.0	2.12
50.0	4.32
$(NH_4)_2SO_4$	
25.0	1.30
50.0	2.64

* g-mol per l.

Molecular Weights (M. W.) Calculated from Osmotic Pressures at Various Dilutions (l/M) [22]

KCl (74.5)	Dil.	1	2	4	6	12	24
	M. W.	240	105	97.5	88.9	84.6	82.7
$CuSO_4$ (159)	Dil.	1	2.49	4.15	8.30	16.60	
	M. W.	274	192	176	163	160	
$BaCl_2$ (208.3)	Dil.	1	5	10	20	40	
	M. W.	226	240	323	321	323	
K_2SO_4 (174.4)	Dil.	2	10	20	40	80	
	M. W.	160	97.3	68.5	64.5	61.7	

For the osmotic pressure of salt solutions, K and Na salts, nitrates, sulfates, salts of organic acids, alums, etc., *see* Adie [2], König and Hasenbaumer [30] and Pfeffer [43]; for camphorates, naphthionates, benzenesulfonates, *o*-nitrobenzoates, silicofluorides, cobalticyanides and other salts, *see* Berkeley and Hartley [7]. Adie's and Pfeffer's results are uncertain by several %; deviations between similar experiments often occur of the order of 10%. Those of Berkeley and Hartley [6, 7] show variations of 1–2%.

Additional Data

Aqueous Solutions of Non-colloids.—Antipyrine [42]; electrolytes [25, 30]; glycerol [42]; mannitol [42]; membranes of chemically inert substances [10]; salicin [42]; sucrose [3, 44, 48].

Colloidal Solutions.—Arsenious sulfide [33]; gelatin [37]; gums [37]; hemoglobins [1, 26, 45]; influence of electrolytes on osmotic pressure of colloids [32]; proteins [34, 36, 47]; serum proteins [46]; starch [37].

Osmotic Pressures in Pyridine, 25°, Caoutchouc Membrane [29]

Values of theoretical (calc.) and observed osmotic pressures in cm Hg

M/l		0.200	0.150	0.125	0.100	0.075	0.050	0.025
Calc.		372	279	232	186	139	93	46
Obs.	Sucrose		252	213	189	119	59	26
	$AgNO_3$		236	167	136	114		
	LiCl	176	117		82	76	50	17

Nitrocellulose in Acetone, 25°, Collodion Membrane [20]

g/l	1.16	3.65	8.33	18.8	46.2	67.2	106.3	141
cm H_2O	0.62	2.68	8.0	25.4	105	210	502	963

Other Non-aqueous Solvents

Ether, water and glycerol mixtures [27].

Lithium chloride in ethyl alcohol with gutta percha membrane [4].

Pyridine solutions and caoutchouc membranes [17, 28, 49].

Rubber solutions [16].

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THE PROPERTIES OF SURFACES: SURFACE TENSION, SURFACE ENERGY AND RELATED PROPERTIES

SURFACE TENSION AND CAPILLARITY: SYMBOLS AND ABBREVIATIONS

Cgs Units Are Used Throughout

γ Surface tension (or free surface energy).*

γ_i Interfacial tension between two non-gaseous phases.

$\Delta\gamma$ (γ for a solution) $-$ (γ for the pure solvent).

γ_M Molecular free surface energy.

a^2 Capillary constant or "specific cohesion."

d_l (resp. d_v) Density of the liquid (resp. of the saturated vapor).

g Acceleration or intensity of gravity at place of observation.

h Effective height of capillary rise.

k_E The Eötvös constant.

M Molecular weight, O = 16.

n The van der Waals constant.

r Internal effective radius of capillary.

t_c (resp. T_c) Critical temperature.

x_A Mole fraction of substance A.

Partout usage des unités cgs

γ Tension superficielle (ou énergie superficielle libre).*

γ_i Tension intersuperficielle entre deux phases non-gazeuses.

$\Delta\gamma$ (γ pour une solution) $-$ (γ pour le solvant pur).

γ_M Énergie superficielle libre moléculaire.

a^2 Constante capillaire ou "cohésion spécifique."

d_l (resp. d_v) Densité du liquide (resp. de la vapeur saturée).

g Accélération ou intensité de la pesanteur au lieu de l'observation.

h Hauteur effective de l'ascension capillaire.

k_E Constante d'Eötvös.

M Poids moléculaire, O = 16.

n Constante de van der Waals.

r Rayon interne effectif du tube capillaire.

t_c (resp. T_c) Température critique.

x_A Fraction moléculaire de substance A.

Das Cgs System wird durchwegs benützt

γ Oberflächenspannung (oder freie Oberflächenenergie).*

γ_i Grenzflächenspannung zwischen zwei nicht gasförmigen Phasen.

$\Delta\gamma$ (γ für eine Lösung) $-$ (γ für ein reines Lösungsmittel).

γ_M Molekulare freie Oberflächenenergie.

a^2 Kapillaritätskonstante oder "spezifische Kohäsion."

d_l (bezw. d_v) Dichte der Flüssigkeit (bezw. des gesättigten Dampfes).

g Beschleunigung oder Intensität der Schwerkraft am Standort der Beobachtung.

h Effektive Steighöhe.

k_E Konstante nach Eötvös.

M Molekulargewicht, O = 16.

n van der Waals-Konstante.

r Effektiver Innenradius der Kapillare.

t_c (bezw. T_c) Kritische Temperatur.

x_A Molenbruch des Stoffes A.

Vengono sempre usate le unità cgs

γ Tensione superficiale (o energia libera superficiale).*

γ_i Tensione alla superficie di contatto tra due fasi non gassose.

$\Delta\gamma$ (γ per la soluzione) $-$ (γ per il solvente puro).

γ_M Energia libera molecolare di superficie.

a^2 Costante di capillarità o coesione specifica.

d_l (o d_v) Densità del liquido (o del vapore saturo).

g Accelerazione o intensità della gravità nel luogo di osservazione.

h Altezza effettiva dell'ascensione capillare.

k_E Costante di Eötvös.

M Peso molecolare, O = 16.

n Costante di van der Waals.

r Raggio interno del capillare.

t_c (o T_c) Temperatura critica.

x_A Frazione di grammimolecola della sostanza A.

EXPERIMENTAL METHODS

Symbol	Methods	Symboles	Méthodes	Zeichen	Methoden	Simbolo	Metodi
(I)	Method of capillary height or pressure.	(I)	Ascension ou pression capillaire.	(I)	Steighöhe oder Kapillardruck.	(I)	Innalzamento oppure pressione capillare.
(II)	Drop-weight method.	(II)	Poids de la goutte.	(II)	Tropfengewicht.	(II)	Peso della goccia.
(III)	Method of maximum bubble pressure.	(III)	Pression maximum de la bulle.	(III)	Maximaldruck für Blasen.	(III)	Pressione massima della bolla.
(IV)	Method of capillary waves.	(IV)	Ondes capillaires.	(IV)	Kapillarwellen.	(IV)	Onde capillari.
(V)	Method of vibrating jet.	(V)	Jet vibrant.	(V)	Vibration.	(V)	Getto capillare.
(VI)	Drop-height method.	(VI)	Hauteur de la goutte.	(VI)	Tropfenhöhe.	(VI)	Altezza della goccia.
(VII)	Drop-shape method.	(VII)	Forme de la goutte.	(VII)	Tropfengestalt.	(VII)	Forma della goccia.
(VIII)	Method of maximum pressure in drops.	(VIII)	Pression maximum dans les gouttes.	(VIII)	Maximaldruck in Tropfen.	(VIII)	Massimo di pressione della goccia.
(IX)	Method of Sentis.	(IX)	Méthode de Sentis.	(IX)	Methode nach Sentis.	(IX)	Metodo di Sentis.

* γ alone means that the liquid or solution was studied in the presence of its own vapor only. γ (air) means that air was present above the surface of the liquid and that, therefore, the liquid surface was in contact with air, saturated, of course, with the vapor of the liquid. γ (air or vapor) means that some measurements were made under each of the above conditions and that the values given are for either within the limits prescribed. γ (H_2), resp. (N_2), states the medium in which measurements were made, while γ (?) indicates that the medium was not stated.

EQUATIONS

Formula for capillary rise:

$$\gamma = \tfrac{1}{2}(d_l - d_v)ghr \text{ (v. further p. 435)} \quad (1)$$

Formula for capillary constant:

$$a^2 = \frac{\gamma}{\tfrac{1}{2}(d_l - d_v)g} \text{ (}=hr\text{ for capillary rise)} \quad (2)$$

Formula of Eötvös:

$$\gamma_M = \gamma\left(\frac{M}{d_l}\right)^{2/3} = A_C - k_E t (\text{resp. } A_K - k_E T) \quad (3)$$

A_C (resp. A_K) is a constant evaluated from the experimental data. For normal liquids this linear relation holds up to $t \not> t_c - 35°$. $A_C = k_E(t_c - 6)$ approximately, a relation which has found application as a means of computing t_c; $k_E = -\frac{d\gamma_M}{dt}$

Formula of van der Waals: $\gamma = \alpha\left(1 - \frac{T}{T_C}\right)^n$ (4)

α and n are constants evaluated from the experimental data.

Formula of Macleod: $\gamma = K(d_l - d_v)^4$, where the constant K is nearly independent of T for normal liquids.

Formula of Sugden: $P = \frac{M}{d_l - d_v}\gamma^{1/4}$

$P = 0.78V_C$ approx. for certain normal liquids.
V_C = molecular volume in cm^3 at the critical temperature.

TENSILE STRENGTH AND ANGLE OF CONTACT

T. Fraser Young and William D. Harkins

TENSILE STRENGTH AND TENSILE ENERGY

The free tensile energy of a liquid is defined as equal to 2γ. It is the reversible work done on the system (increase of free energy) to rupture a bar of liquid of one cm^2 cross section to form two plane surfaces of 1 cm^2 area each. The total tensile energy (e_t) per cm^2 is given by the relation: $e_t = 2(\gamma + l) = 2h$, (l = latent heat, h = surface energy of unit surface).

It has not been found possible to measure the tensile strength of a liquid, since the rupture does not occur simultaneously over more than a minute area. The maximum value of the pull which has thus far been attained, is given below:

Maximum negative pressure in megabaryes (13): H_2O = 34 at 24.4°C; C_2H_5OH = 40 at 22.5°C; $(C_2H_5)_2O$ = 73 at 17.7°C.

The pull necessary to rupture a film of various liquids between two flat steel surfaces of contact, 4.5 cm^2 in area, has been found to be as large as 3–4 megabaryes, but this is probably much lower than that corresponding to the true tensile strength of the liquid (4).

ANGLE OF CONTACT

The angle of contact (θ) between the surface of a liquid and that of a solid is highly dependent upon the nature of the surfaces, and is in general different for contaminated surfaces from what it is for clean surfaces. In few of the experiments in which θ has been determined has cleanliness of the surface of the liquid been demonstrated, and the difficulty of cleaning the surface of a solid is so great that no experiments with what may be called pure surfaces have been carried out with solids.

By use of various optical methods it has been shown (Table 1) that θ between glass and a small number of liquids is zero provided the glass is already covered by a film of the liquid. θ may be greater than zero provided the liquid is evaporating (14), or the glass surface has become dry (15).

Table 1.—Angle of Contact (θ) between Liquid and Glass Covered with a Film of the Liquid at Room Temperature as Determined by Various Optical Methods

Liquid	θ	Lit.
Water	0	(1, 3, 14, 15)
Ethyl alcohol	0	(14)
Benzene	0	(14)
Carbon tetrachloride	0	(14)
Chloroform	0	(14)
Acetic acid	0	(3)
Aqueous solutions of various salts	0	(15)
Glycerol	0	(1)
Ethyl ether	0	(3, 14)
Turpentine	0	(1, 3)
Olive oil	0	(1)
Hydrogen peroxide	0	(12)

That θ for liquid-to-glass is zero within the limits of error of the methods employed is indicated in the case of about 100 other liquids by the data used in compiling these tables, which show that the surface tension determined by the capillary-height method on the basis of the assumption that θ is zero, is the same for each of these liquids as the value obtained by the drop-weight method by the use of the corrections of Harkins and Brown or by the bubble-pressure method by the use of the corrections of Sugden. In addition Volkmann (16) found a^2 for H_2O = constant ± 0.0002 at 20.2°C for seven different kinds of glass and Carver and Hovorka (5) found a^2 for H_2O = constant ± 0.0002 at 20° for glass, zinc, copper and silver.

Table 2.—Angle of Contact Greater than Zero

Interface	t, °C	θ, °arc	Lit.
H_2O—azobenzene	14	77°	(3)
H_2O—paraffin	14	106° 43′	(3)
Hg—glass	4.4	144.48°	(2)
	3	148.28°	
	4	147.71°	
	3	140.00°	
	9	139.41°	(2)
	16	>139°	(1)
	18	128°	(8)
H_2O—various plates coated with oleic acid			(11)
H_2O—plates coated with 65 different organic compounds			(18)

For angle of contact of a lens of H_2O on CCl_4, v. (6).

It should be noted that in cases where the last terms of the Laplace-Poisson equation (v. (2), p. 8)

$$h = a\sqrt{2}\sin\frac{\theta}{2} - \frac{a^2}{\mu} + \frac{a^2}{3r'\sin\frac{\theta}{2}}\left(1 - \cos^3\frac{\theta}{2}\right)$$

are not used, the values of θ given are often 5 or more degrees in error; $r' = r + (\sqrt{2} - 1)a$; h is approximate thickness of a drop of liquid of horizontal radius r which lies on a horizontal plane plate; μ is its radius of curvature.

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METHODS OF MEASURING SURFACE TENSION

T. Fraser Young and William D. Harkins

For critical discussion of various methods, their sources of error, corrections, precautions, etc., *see* especially ([3, 4, 5, 6, 14]); *cf.* ([7]) and the references cited below.

The *Capillary-Height Method.*

$$2\pi r\gamma = V(d_1 - d_2)g/\cos\theta,$$

in which d_1 is the density of the fluid of greater density and d_2 is the density of the other fluid; V is the volume which lies inside a capillary tube of uniform bore, between the small meniscus and the level of a horizontal plane which lies in the surface of the (extremely) large meniscus.

$$V = \pi r^2 h,$$

in which h may be considered as the average vertical distance between the two surfaces. If h_0 is the vertical distance between the plane of the large meniscus and a horizontal plane tangent to the small meniscus, then for capillary tubes of very small diameter (< 1 mm for H_2O):

$$h = h_0 + \frac{r}{3} - 0.1288\frac{r^2}{h_0} + 0.1312\frac{r^3}{h_0^2} \text{ (Poisson, Rayleigh)}$$

or approximately

$$h = h_0 + \frac{a^2 r}{3a^2 + r^2} \text{ (Hagen and Desains)}$$

This expression is not equivalent to that given by Rayleigh.

For tubes of considerably larger diameter $\left(\frac{r}{a} > 4.3\right)$,

$$1.4142\frac{r}{a} - \log_e\frac{a}{h_0} = 0.6648 + 0.19785\frac{a}{r} + \frac{1}{2}\log_e\frac{r}{a} \text{ (Rayleigh)}$$

For tubes of intermediate diameters neither equation is accurate and the tables of Bashforth and Adams ([1]) should be used to obtain h. *See further* ([2, 5, 11, 12, 15]).

Drop-Weight Method.

$$\gamma = \frac{mg}{r} \times F,$$

m is the mass of a slowly formed drop which falls from a horizontal tip of circular cross-section (radius $= r$) and sharp edge. F is a function of V/r^3, where V is the volume of the drop, and its value may be interpolated from the following table (for theory, *v.* ([9])).

Experimental Values for Drop Weight Corrections ([5])

V/r^3	F	$\pm$ %	V/r^3	F	$\pm$ %
∞	0.159		2.3414	0.26350	0.1
5000	0.172		2.0929	0.26452	0.05
250	0.198		1.8839	0.26522	0.05
58.1	0.215		1.7062	0.26562	0.05
24.6	0.2256		1.5545	0.26566	0.05
17.7	0.2305	0.3	1.4235	0.26544	0.05
13.28	0.23522	0.25	1.3096	0.26495	0.1
10.29	0.23976	0.2	1.2109	0.26407	0.1
8.190	0.24398	0.15	1.124	0.2632	0.15
6.662	0.24786	0.15	1.048	0.2617	0.15
5.522	0.25135	0.15	0.980	0.2602	0.15
4.653	0.25419	0.15	.912	0.2585	0.15
3.975	0.25661	0.15	.865	0.2570	0.2
3.433	0.25874	0.15	.816	0.2550	
2.995	0.26065	0.15	.771	0.2534	
2.637	0.26224	0.1	.729	0.2517	

V/r^3	F	$\pm$ %	V/r^3	F	$\pm$ %
0.692	0.2499		0.541	0.2430	
.658	0.2482		.512	0.2441	
.626	0.2464		.483	0.2460	
.597	0.2445		.455	0.2491	
.570	0.2430		.428	0.2526	
			.403	0.2559	

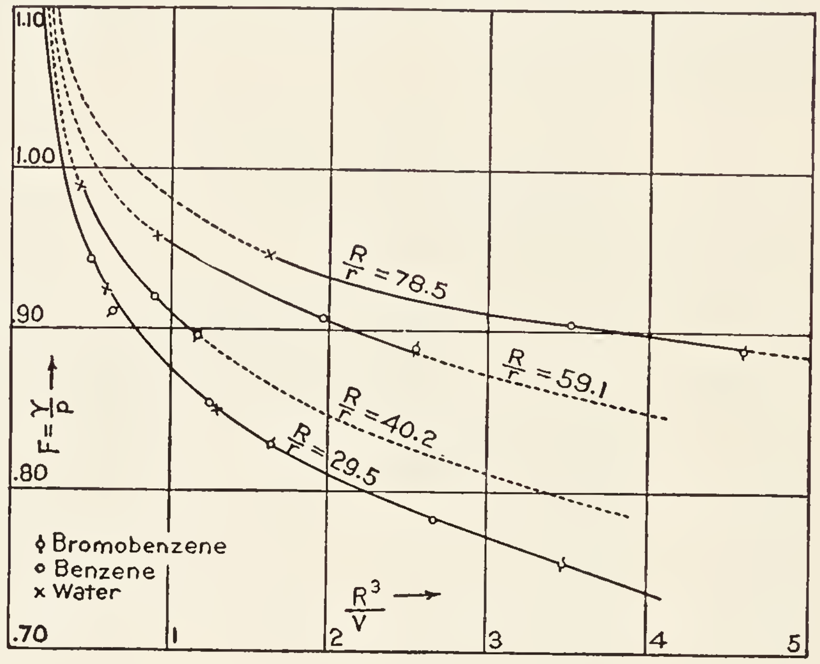

Fig. 1.

Method of Maximum Pull on a Ring.—When a circular ring of radius R (center of ring to center of wire) is pulled from the surface of a not-too-viscous liquid into the gas phase above, the surface tension is given by

$$\gamma = p \times F,$$

where p is the pull in dyne/cm and F is a function of R^3/V whose value may be interpolated from Fig. 1 for any ring of radius R constructed from a wire of radius r. V, the volume of the liquid lifted by the ring $\equiv \frac{p}{g(d_l - d_g)}$, where d_l is the density of the liquid and d_g that of the gas above it ([8, 10, 13]).

Other Methods.—*v.* ([3, 4, 7, 14]).

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(For a key to the periodicals see end of volume)

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INTERFACIAL TENSION FOR SOLID-LIQUID AND LIQUID-LIQUID INTERFACES

T. Fraser Young and William D. Harkins

CONTENTS

INTERFACE, SOLID—LIQUID

Free surface energy at the interface solid—liquid

No method has as yet been discovered for the determination of the free interfacial energy between a solid and a liquid. For values calculated from the Ostwald-Freundlich equation, *v.* (5, 25). *See further* (1, 2, 7, 9, 25, 26, 34).

INTERFACE, LIQUID—LIQUID

Abbreviations; *see also* p. 433

γ_i Interfacial tension, cgs.

γ Surface tension of organic liquid, cgs.

d_p (resp. d_o and d_w) Density of pure organic liquid (resp. the organic phase, and the aqueous phase), g/cm³.

Except where otherwise noted all values recorded below were obtained by the drop-weight method.

Accuracy.—No attempt has been made to estimate accuracy except in cases where independent determinations with different samples are available. The attainable precision by the drop-weight method appears to be about 0.1 % at a water interface and 1 % at a mercury interface. Other methods have thus far yielded considerably less accurate results.

The interfacial tension at the phase boundary liquid—liquid is in general varied much more by impurities than the surface tension at the liquid—gas interface. It is not yet known how well the drop-weight method applies to the determination of γ_i at the liquid—liquid interface since the corrections were determined under the somewhat different conditions existing at the liquid—gas interface.

Interface, Water—Organic Liquid: ℭ-Table, The ℭ-Arrangement

Formula	Name	γ_i	γ (air)	d_p	d_o	d_w	t, °C	Lit.
CCl_4	Carbon tetrachloride*	45.0±1.0	26.66	1.590	1.5846	0.9972	20	(12)
CS_2	Carbon disulfide	48.36	31.38	1.261	1.2596	0.9972	20	(12)
$CHBr_3$	Bromoform	40.85	41.53	2.8854	2.8818	1.0004	20	(16)
$CHCl_3$	Chloroform	32.80±0.2	27.13	1.485	1.4831	1.0002	20	(12, 19)
CH_2Cl_2	Methylene chloride	28.31	26.52	1.3478	1.3286	1.0018	20	(12)
CH_2I_2	Methylene iodide	48.50	50.76	3.3190	3.3180	0.99908	20	(16)
CH_3NO_2	Nitromethane	9.66	36.82	1.1385	1.1288	1.0184	20	(12)
C_2Cl_4	Tetrachloroethylene	47.48	31.74	1.6216	1.6219	0.99844	20	(16)
$C_2H_2Br_4$	Acetylene tetrabromide	38.82	49.67	2.9620	2.9588	0.9986	20	(12)
$C_2H_4Br_2$	Ethylene dibromide*	36.54	38.71	2.178	2.1773	0.9991	20	(12)
C_2H_5Br	Ethyl bromide	31.20	24.16	1.441	1.4460	1.0001	20	(12)
C_2H_5I	Ethyl iodide	40.0	29.9				16	(8, 10)
C_2H_6S	Ethylmercaptan	26.12	21.82			0.9982	20	(12)
$C_3H_4Cl_2O$	1, 1-Dichloroacetone	14.43	31.91	1.236		1.0170	20	(12)
$C_3H_5Br_3$	1, 2, 3-Tribromopropane	38.50	45.36	2.4171	2.4152	0.99892	20	(16)
C_3H_5ClO	Chloroacetone	7.11	35.27	1.170	1.1581	1.0029	20	(12)
C_4H_7N	Butyronitrile	10.38	28.06	0.79040	0.99426	0.99201	20	(12)
$C_4H_8Cl_2S$	β, β′-Dichloroethyl sulfide	28.36	42.82	1.2732			20	(14)
C_4H_9Cl	Isobutyl chloride	24.43	21.94	0.8754	0.8766	0.9973	20	(12)
C_4H_9Cl	*tert.*-Butyl chloride	23.75	19.59	0.8422	0.8423	0.9990	20	(12)
$C_4H_{10}O$	Isobutyl alcohol	2.1			0.8424	0.9834	18	(1.5)
$C_4H_{10}O$	Ethyl ether	10.70±0.2	17.10		0.7174	0.9868	20	(12)
C_5H_9N	Isovaleronitrile	14.14	26.03	0.79106	0.79294	0.99622	20	(12)
C_5H_{10}	Trimethylethylene	36.69	17.26				20	(12)
$C_5H_{10}O$	Methyl propyl ketone	6.28	24.15	0.8067	0.8125	0.9897	20	(12)
$C_5H_{10}O_2$	Isovaleric acid	2.73	25.33	0.9295	0.9457	0.9998	20	(12)
$C_5H_{10}O_3$	Diethyl carbonate	12.86	26.31		0.97513	0.99905	20	(12)
$C_5H_{11}Cl$	Isoamyl chloride	15.44	23.48	0.86962	0.87146	0.9955	20	(12)
C_5H_{12}	Isopentane	49.64	13.72	0.6200	0.6198	0.9982	20	(12)
$C_5H_{12}O$	Amyl alcohol (inactive mixt.) (I)	4.9±2.0			0.804		30	(33)
$C_5H_{12}O$	Isoamyl alcohol	5.0			0.8291	0.9952	18	(1.5)
C_6H_5Br	Bromobenzene	39.82	36.26	1.5016	1.5013	0.99862	20	(16)
C_6H_5Cl	Chlorobenzene	37.41	33.08	1.053	1.1047	0.9972	20	(12)
C_6H_5I	Iodobenzene	45.67	40.35				16.8	(8, 10, 16)
		41.84	39.70	1.8258	1.8255	0.99832	20	
$C_6H_5NO_2$	Nitrobenzene	25.66	43.38		1.2012	0.9976	20	(12)
C_6H_6	Benzene*	35.00±0.05	28.86		0.8788	0.9980	20	(10, 11, 12, 13, 22)
C_6H_7N	Aniline	5.77	42.58	1.022	1.216	0.9990	20	(12)
$C_6H_{12}O$	Cyclohexanol	3.92	34.23				16.2	(8, 10)
$C_6H_{12}O$	Ethyl propyl ketone	13.58	25.39	0.8152	0.8152	0.9964	20	(12)

Formula	Name	γ_i	γ (air)	d_p	d_o	d_w	t, °C	Lit.
$C_6H_{12}O$	Methyl butyl ketone	9.73	25.49	0.8124	0.8160	0.9956	20	(12)
$C_6H_{12}O$	Methyl *tert.*-butyl ketone	10.81	23.43	0.8055	0.8090	0.9954	20	(12)
C_6H_{14}	*n*-Hexane*	51.10 ± 0.2	18.43	0.6595	0.6597	0.9972	20	(12)
$C_6H_{15}N$	Dipropylamine	1.66	22.54	0.73853	0.81620	0.98844	20	(12)
C_7H_5NS	Phenyl isothiocyanate	39.04	41.44	1.1326	1.1331	0.99795	20	(16)
C_7H_6O	Benzaldehyde	15.51	40.04	1.0504	1.0445	0.9981	20	(12)
C_7H_7Br	*o*-Bromotoluene	41.15	35.85	1.4218	1.4318	0.99823	20	(16)
$C_7H_7NO_2$	*o*-Nitrotoluene	27.19	41.46	1.168	1.1599	0.9972	20	(12)
$C_7H_7NO_2$	*m*-Nitrotoluene	27.68	40.99	1.168	1.1547	0.9971	20	(12)
C_7H_3	Toluene	36.1					25	(37)
C_7H_3O	Anisole	25.82	35.22	0.99327	0.99270	0.99715	20	(12)
C_7H_8O	Benzyl alcohol	4.75	39.71				22.5	(8, 10)
$C_7H_{14}O_2$	Heptylic acid*	7.00 ± 0.5	28.31				20	(11, 12)
$C_7H_{14}O_2$	Ethyl isovalerate	18.39	23.68	0.8648	0.8658	0.9971	20	(12)
C_8H_8	Styrene	35.48	32.14				19.0	(8, 10)
C_8H_{10}	Ethylbenzene	31.35	29.62				17.5	(8, 10)
C_8H_{10}	*o*-Xylene	36.06	29.89	0.87810	0.87806	0.99707	20	(12)
C_8H_{10}	*p*-Xylene	37.77	28.33	0.86444	0.86494	0.99680	20	(12)
$C_8H_{10}O$	Phenetole	29.40	32.74	0.96474	0.96474	0.99820	20	(12)
$C_8H_{16}O$	Methyl hexyl ketone	14.09	26.79	0.8192	0.8205	0.9980	20	(12)
$C_8H_{16}O_2$	Caprylic acid	8.217	28.82				18.1	(8, 10)
$C_8H_{16}O_2$	Ethyl caproate*	19.80 ± 2	25.81		0.8705	0.9973	20	(19)
C_8H_{18}	*n*-Octane*	50.81 ± 0.1	21.77	0.7022	0.7021	0.9971	20	(12)
$C_8H_{18}O$	*n*-Octyl alcohol*	8.52 ± 0.2	27.53	0.8252	0.8301	0.9981	20	(12)
$C_8H_{18}O$	Methylhexyl carbinol	9.42 ± 0.2	26.52	0.8211	0.8257	0.9974	20	(12)
$C_8H_{19}N$	Diisobutylamine	10.28	22.05	0.74428	0.74763	0.99680	20	(12)
C_9H_{12}	Mesitylene	38.70	28.51	0.86124	0.86140	0.99717	20	(12)
$C_9H_{18}O_2$	Isoamyl butyrate	23.00	25.19	0.86272	0.86280	0.99672	20	(12)
$C_{10}H_7Br$	α-Bromonaphthalene	42.07	44.59	1.4836	1.4739	0.99828	20	(16)
$C_{10}H_7Cl$	α-Chloronaphthalene	40.74	41.80	1.1706	1.1700	0.9982	20	(16)
$C_{10}H_{14}$	*p*-Cymene	34.61	28.09	0.85618	0.85630	0.99702	20	(12)
		39.41	28.75				13.50	(8, 10)
$C_{10}H_{22}$	Diisoamyl	46.80	22.24	0.72216	0.72253	0.99696	20	(12)
$C_{10}H_{23}N$	Diisoamylamine	13.51			0.77628	0.99815	20	(19)
$C_{11}H_{12}O_2$	Ethyl cinnamate	21.36	38.42				19.5	(8, 10)
$C_{11}H_{14}O_2$	Ethyl hydrocinnamate	20.19	35.08				21.5	(8, 10)
$C_{11}H_{20}O_2$	Undecylenic acid	10.14	30.64	0.90604	0.90762	0.99610	25	(12)
$C_{11}H_{22}O_2$	Ethyl nonylate	23.88	28.04				20	(12)
$C_{12}H_{14}O_4$	Diethyl phthalate	16.27	37.34				20.5	(8, 10)
$C_{18}H_{34}O_2$	Oleic acid	15.59 ± 0.2	32.50				20	(10, 12*)
		15.68†	32.50	0.8910	0.8908	0.9982	20	
$C_{18}H_{34}O_3$	Ricinoleic acid	14.25	35.81				16	(8, 10)
$C_{20}H_{38}O_2$	Ethyl oleate‡	21.34			0.87601		20	(19)

* Between 10 and 40°C, the γ_i temperature coefficients of the following liquids are approximately constant: $d\gamma_i/dt$ for $CCl_4 = -0.098$; for $C_2H_4Br_2 = -0.108$; for $C_6H_6 = -0.058$; for $C_6H_{14} = -0.026$; for $C_7H_{14}O_2 = -0.037$; for $C_8H_{18} = -0.048$; for $C_5H_{18}O = +0.039$; for *sec.*-$C_8H_{18}O = +0.041$ (11). For ethyl caproate and heptaldehyde, *v.* (11).

† The oleic acid and water were mixed with each other but were not mutually saturated (12).

‡ A sample of Kahlbaum's ethyl oleate gave γ_i = 18.7 at 20°, but contained an amount of free acid equivalent to 1.65 % oleic acid.

Interface, Aqueous Solution—Organic Liquid

CCl_4; 22 ± 2°C (28)

Salt	C*	$\Delta\gamma_i$†	Method	Salt	C*	$\Delta\gamma_i$†	Method
$FeCl_3$	0.1	0.9	I	KBr	0.1	0.8	II
	1.0	−0.1	I		1.0	1.7	II
$MgSO_4$	0.1	−1.2	I	KI	0.1	1.1	II
	1.0	−2.4	I		1.0	0.8	II
$CaCl_2$	0.1	0.4	I	K_2SO_4	0.1	0.6	II
	1.0	2.3	I		0.5	0.9	II
NaCl	0.1	1.0	I		1.0	1.5	II
	1.0	2.3	I		0.1	0.2	I
NaBr	0.1	0.5	II		1.0	0.1	I
	1.0	0.8	II	KCNS	0.1	0.9	II
KCl	0.1	0.5	I		1.0	−0.8	II
	1.0	2.1	I				
	0.1	0.1	II				
	1.0	1.5	II				

Also γ_i for aqueous H_2SO_4, and for mixtures of KCl and KCNS in water.

$CHCl_3$; 22 ± 2°C (28)

Salt	C*	$\Delta\gamma_i$†	Method	Salt	C*	$\Delta\gamma_i$†	Method
$FeCl_3$	0.1	2.9	I	KBr	0.1	1.4	II
	1.0	3.5	I		1.0	1.3	II
$MgSO_4$	0.1	3.2	I	KI	0.1	1.1	II
	1.0	2.6	I		1.0	0.2	II
$CaCl_2$	0.1	2.5	I	K_2SO_4	0.1	3.2	I, II
	1.0	2.6	I		1.0	1.4	I
NaCl	0.1	2.8	I		0.1	3.2	II
	1.0	3.6	I		0.5	4.7	II
NaBr	0.1	1.1	II		0.75	3.2	II
	1.0	0.0	II		1.0	2.4	I, II
KCl	0.1	3.0	I	KCNS	0.1	1.2	II
	1.0	4.0	I		1.0	−0.4	II
	0.1	1.6	II				
	1.0	1.8	II				

* C = M/l_s. † ±2.

$C_4H_{10}O$, Ethyl ether; 22 ± 2° [28]

Salt	M/l_s	$\Delta\gamma_i$ ±2	Method
H_2SO_4	0.2	0.2	II
	2.0	0.4	II
$FeCl_3$	0.1	0.7	II
	1.0	1.2	II
$MgSO_4$	0.1	0.8	II
	1.0	1.6	II
$CaCl_2$	0.1	0.8	II
	1.0	2.2	II
NaCl	0.1	0.2	I
	0.5	0.8	I
	1.0	1.0	I
NaBr	0.1	0.2	II
	1.0	1.5	II
KCl	0.1	0.7	I
		0.4	II
	1.0	1.4	I
		1.7	II
KBr	0.1	0.3	II
	1.0	1.4	II
KI	0.1	−0.7	II
	1.0	−1.5	II
K_2SO_4	0.1	0.3	II
	1.0	1.3	II
KCNS	0.1	−0.6	II
	1.0	−1.8	II

$C_6H_5NO_2$, Nitrobenzene; 22 ± 2° [28]

Salt	M/l_s	$\Delta\gamma_i$ ±2	Method
H_2SO_4	0.1	0.2	II
	0.2	0.1	II
	0.5	0.1	II
	1.0	−0.1	II
	2.0	−0.4	II
$FeCl_3$	0.1	0.6	I
	1.0	0.9	I
$MgSO_4$	0.1	0.4	I
	1.0	0.4	I
$CaCl_2$	0.1	0.5	I
	1.0	1.1	I
NaCl	0.1	0.0	I
	1.0	1.9	I
NaBr	0.1	0.0	II
	1.0	0.3	II
KCl	0.1	0.7	I
	1.0	1.7	I
	0.1	0.2	II
	1.0	0.8	II
KBr	0.1	0.3	II
	1.0	0.2	II
KI	0.1	0.1	II
	1.0	−1.6	II

$C_6H_5NO_2$.—(*Continued*)

Salt	M/l_s	$\Delta\gamma_i$ ±2	Method
K_2SO_4	0.1	1.1	I
	1.0	1.1	I
	0.1	0.1	II
	1.0	0.2	II
KCNS	0.1	−0.3	II
	1.0	3.1	II
$C_2H_3Cl_3O_2$,	0.5*	−0.9	I
Chloral-	1.0*	−2.9	I
hydrate	2.0*	−4.0	I

* Wt. %.

$C_4H_8Cl_2S$, β, β′-Dichloroethyl sulfide; 20°C; d_4^{20} = 1.2732 (I) [14]. Phases not mutually saturated.

	d_w	γ_i
Vapor		42.82
Water	0.9982	28.36
0.1*N* HCl	1.0001	28.90
0.1*N* NaOH	1.0032	12.78
0.1*N* Na_2CO_3	1.0025	18.82

$C_5H_{11}NO_3$, Isoamyl nitrate against 0.177*N* KCl (II) [12]

γ_i	γ	d_p
30.80	27.18	0.99710
d_o	d_w	t
0.99745	1.0059	20

C_6H_6, Benzene

1% aq. soln. chloral hydrate at 22 ± 2° (I), $\Delta\gamma_i$ = −3.6 [28].

Aq. soln. of NaCl at 25 ± 0.01°C (II) [16.5]

M/l_s	$\Delta\gamma_i$ ± 0.2
0.3	0.63
0.5	0.86
1.0	1.56
3.0	4.04
5.0	6.59

Aq. solutions of acids: acetic [18]; butyric [17.5].

Dimethylaniline + benzene or heptane, against water [31].

Interfacial tensions and distributions for the two-phase system, butyric acid + hexane + H_2O [18].

$C_8H_{18}O$, Caprylic alcohol

For the pure alcohol, γ = 26.35, relative viscosity = 3.126, d_4^{25} = 0.82026, 25° [4]

Solution	Wt. %	γ_i
Water	0.0	9.80
Sucrose	30.0	10.88
Dextrin	10.0	3.85
Starch	1.0	10.17
Gum arabic	10.0	9.24

$C_{18}H_{34}O_2$, Oleic acid against 0.116*N* HCl (II) [12]

γ_i	d_p	d_o	d_w	t
15.99	0.8910	0.8908	1.0006	20

Benzene against aqueous soap solutions (II); sodium oleate [13]; effects of oleic acid and of NaOH [22]; *see further* final index under Soaps.

Effect of Hydrogen Ion Concentration on Tension at the Interface Aqueous Phase—Organic Phase

Inorganic acids and bases at concentrations up to 0.2 normal have only a very slight effect (≯ *ca.* 1%) upon the interfacial tension at the phase boundary benzene—aqueous solution, and have in general a marked effect at low concentrations only in case they react with the organic phase. Thus with esters the presence of a base in the aqueous phase accelerates the hydrolysis. For example, the interfacial tension, ethyl oleate—water, is lowered very rapidly as the concentration of strong base in the aqueous phase is increased, since the rapidity at which sodium oleate is produced at the surface increases with the concentration of the base. Since the chemical composition of the interfacial region changes in such a case with the time, no equilibrium values can be obtained, but in many cases somewhat definite values are obtained provided the liquids are left in contact only about one-half hour.

For numerical data see the literature cited below: Ethyl oleate [19]; ethyl caproate [19]; chloropicrin [20]; diisoamylamine [19]; *sec.*-octyl alcohol [19]; dichloroethyl sulfide [14]; benzene [13].

For aqueous solutions buffered by borate or phosphate against benzene solutions of organic acids and esters, *v.* [23].

Interfacial Tensions of Liquid Metals against Non-metallic Liquid Phases

γ_i (resp. γ_{Hg}, γ_l) = interfacial tension, resp. surface tension of Hg, resp. surface tension of the second liquid.

Mercury against a Pure Liquid

H_2O, Water (II) [17]

γ_i	γ_l	t, °C
375	72.8	20

CS_2, Carbon disulfide (II) [17]

γ_i	γ_l	t, °C
336	31.4	20

CH_2Cl_2, Methylene chloride (II) [15]

γ_i	γ_l	t, °C
342.5	26.5	20

CH_3I, Methyl iodide (II) [15]

γ_i	γ_l	t, °C
304	35.0	20

$C_2H_4Br_2$, Ethylene bromide (II) [15]

γ_i	γ_l	t, °C
326	38.7	20

$C_2H_4Cl_2$, 1, 1-Dichloroethane (II) [15]

γ_i	γ_l	t, °C
337	25.7	20

$C_2H_5NO_2$, Nitroethane (II) [17]

γ_i	γ_l	t, °C
378	34.9	20

C_2H_6O, Ethyl alcohol (II) [15]

γ_i	γ_l	t, °C
364	22.4	20

C_3H_8O, *n*-Propyl alcohol (II) [17]

γ_i	γ_l	t, °C
368	23.7	20

$C_4H_{10}O$, Ethyl ether (II) [17]

γ_i	γ_l	t, °C
379	21.8	20

$C_4H_{10}O$, Isobutyl alcohol (II) [17]

γ_i	γ_l	γ_{Hg}	t, °C
349.1	24.3	480	0
345.6	23.5	478	10

$C_4H_{10}O$.—(*Continued*)

γ_i	γ_l	γ_{Hg}	t, °C
342.7	22.7	476	20
341.0	22.0	474	30
340.2	21.3	471	40
339.3	20.5	469	50

$C_5H_{12}O$, Iso(?)-amyl alcohol (III) [3]

γ_i	γ_l	t, °C
261.6		25

$C_6H_5NO_2$, Nitrobenzene (II) [15]

γ_i	γ_l	t, °C
350.5	43.4	20

C_6H_6, Benzene (II) [17]

γ_i	γ_l	γ_{Hg}	t, °C
361.3	30.4	478	10
357.2	28.9	476	20
353.7	27.6	474	30
351.4	26.3	471	40
349.8	24.9	469	50
348.8	23.6	467	60

C_6H_7N, Aniline (II) [17]

γ_i	γ_l	t, °C
341	42.6	20

C_6H_{14}, *n*-Hexane (II) [17]

γ_i	γ_l	t, °C
378	18.4	20

C_7H_8, Toluene (II) [17]

γ_i	γ_l	t, °C
359	29.0	20

C_8H_{10}, *o*-Xylene (II) [17]

γ_i	γ_l	t, °C
359	29.0	20

C_8H_{10}, *m*-Xylene (II) [17]

γ_i	γ_l	t, °C
357	29.0	20

C_8H_{10}, *p*-Xylene (II) [17]

361	27.0	20

C_8H_{18}, *n*-Octane (II) [17]

γ_i	γ_l	γ_{Hg}	t, °C
377.2	23.7	480	0
375.8	22.7	478	10
374.7	21.8	476	20
373.4	20.8	474	30
372.6	19.8	471	40
371.3	18.8	469	50
371.1	17.9	467	60

$C_8H_{18}O$, *sec.*-Octyl alcohol (II) [17]

365.4	27.9	480	0
361.7	27.2	478	10
359.0	26.3	476	20
357.3	25.5	474	30
355.0	24.7	471	40
353.6	23.8	469	50

$C_{10}H_{23}N$, Diamylamine (II) [17]

γ	γ_l	t, °C
371	24.6	20

$C_{11}H_{20}O_2$, Undecylenic acid (II) [17]

353	30.6	20

$C_{18}H_{34}O_2$, Oleic acid (II) [17]

322	32.5	20

Mercury against Aqueous Solutions

d = density of aqueous solution, $t°/4°$
N = normality of aqueous soln.

HCl (VI) [27]

d (or N)	γ_i	t
1.004	362.8	19–20
1.032	356.1	
1.122	342.4	
1.190	335.7	

H_2SO_4 (VI, VII) [27, 32]

1.015	337.5	19.5

H_2SO_4.—(*Continued*)

d (or N)	γ_i	t
1.071	319.7	19.5
1.0559	316	20

C_2H_6O, Ethyl alcohol (IV, VI) [27, 36]

0.969	363.2	19.5
0.927	361.1	19.5
0.825	366.6*	0
0.795	364.0	19.5

* Value determined by Method VI.

$C_2H_4O_2$, Acetic acid (VII) [32]

1.006	344	20.0

$Pb(C_2H_3O_2)_2$ (VII) [6]

2*N*	348	20
2*N**	338	20

* $+0.28 \times 10^{-3}N$ $Hg_2(CH_3COO)_2$.

$ZnCl_2$ (VI) [27]

1.094	359.0	19.5
1.426	328.7	19.5
1.683	304.7	19.5

$ZnSO_4$ (VII) [6]

2*N*	334	20
2*N**	258	20

* $+2.53 \times 10^{-3}N$ Hg_2SO_4.

$CdSO_4$ (VII) [6]

2*N*	324	20
2*N**	283	20

* $+1.66 \times 10^{-3}N$ Hg_2SO_4.

$CuSO_4$ (VI) [27]

1.012	343.2	19.5
1.067	334.9	19.5
1.103	331.7	19.5

Li_2SO_4 (VII) [6]

1*N*	365	20

NaOH (VI) [27]

1.006	407.1	19.5
1.079	423.0	19.5
1.296	429.4	19.5

Na_2SO_4 (VI, VII) [6, 27]

1.010	371.8	19.5
1.057	371.0	19.5
1.098	377.3	19.5
1*N*	333	20
1*N**	288	20

* $+2.8 \times 10^{-3}N$ Hg_2SO_4.

$NaC_2H_3O_2$ (VI) [27]

d (or N)	γ_i	t
1.014	379.0	19.5

K_2SO_4 (VII) [6]

1*N*	354	20

$K_2C_2O_4$ (VI) [27]

1.029	352.3	19.5
1.145	353.6	19.5

Rb_2SO_4 (VII) [6]

0.1*N*	362	20

Lead against Fused Salt Mixtures

Equimolar mixture of KCl + $PbCl_2$ (I) [29]		$KCl + PbCl_2$ (I), t = 555 – 603° [29]	
t	γ_i	Wt. % KCl	γ_i
450	232	0	168
550	216	10	185
590	210	20	205

Interface, Organic Liquid—Organic Liquid

CS_2 against CH_4O, Methyl Alcohol

γ_i	d,CS_2 phase	d,CH_4O phase	Method	t	Lit.
1.1	1.1333	0.7466	II	18	[1.5]

Effect of Pressure on Interfacial Tension at 25° (I) [30]

Values of $10^3 \frac{1}{\gamma}\frac{\Delta\gamma}{\Delta P}$; unit of P is one dyne/cm²

Phases \ $10^{-6}P$		69	138	207	276	345	413
Hg	H_2O + 3 % HNO_3	1.8	3.2	4.6	6.5	7.9	9.3
		1.5	3.0	4.8	5.7	6.9	8.6
	Ether + 3 % HNO_3	3.3	5.7	7.6	10.2	12.3	
H_2O	Ether	–40.7	–81.9	–123.9	–165.9	–207.3	
	$CHCl_3$	– 0.4	– 2.4	– 4.8	– 5.5	– 7.3	
	CS_2	2.7	9.3	15.2	23.7		

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SURFACE TENSION OF METALS

W. Rosenhain, Special Editor

C. Benedicks (CB), L. L. Bircumshaw (LLB) C. H. Desch (CHD), O. F. Hudson (OFH) and T. K. Rose (TKR)

Metal	Gas	t, °C	γ	a^2	Method (*v.* p. 433)	Cooperating experts	Lit.
Ag‡	Air	970	80$_0$	0.172	I, II, VII	TKR	[3, 11, 18]
Au	Air	1070	580–1000		I, II, VII	TKR	[6, 11, 18]
Bi	H_2	320–472	$\gamma = 378 - 0.063(t - 269)$; $a^2 = 0.0765 - 0.0_533(t - 269)$		VIII	OFH	[7]
Bi	H_2	583	354		III		[17]
	H_2	300	388		III	LLB	[24]
		300–962	$\Delta\gamma/\Delta t = -0.073$		III	LLB	
	CO	700–800	346		I		[11]
Cd	H_2	421–544	$\gamma = 630 - 0.065(t - 320)$; $a^2 = 0.160_4 + 0.0_555(t - 320)$		VIII		[7]

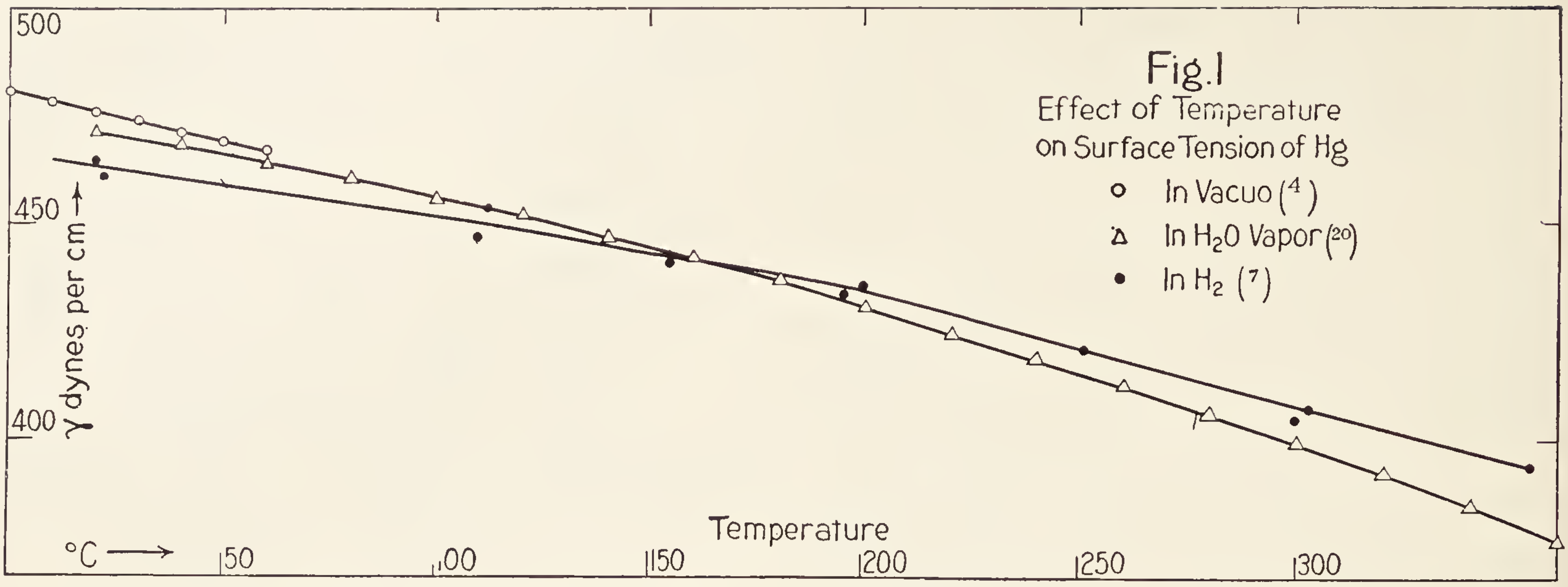

Fig. 1 Effect of Temperature on Surface Tension of Hg

Metal	Gas	t, °C	γ	a^2	Method (v. p. 433)	Cooperating experts	Lit.
Cu†	Vac.	MP–1400		0.304 ± 2 %	I		(8)
	H_2	1131	1103		III	LLB	(17)
		1131–1215	$d\gamma/dt = 0.74$		III	LLB	
Ga	CO_2	30	358	0.120	VI	CHD	(16)
Hg*	Vac.	0	47_0	0.070_5	II	TKR	(2, 4)
	Vac.	0	480.3	0.0721	II		(4)
	Vac.	60	467.1	0.0709	II		(4)
	Vac.	*v. also* Fig. 1					
	Air	15	48_7	0.073_2	II, V, VII		(5, 9, 10, 19)
	Air	For effect of time, *v.* Fig. 2					
	H_2	20	46_6	0.070_2	III, VII		(7, 19)
	H_2	19	470		III	LLB	(24)
	H_2	For effect of temperature, *v.* Fig. 1					
	N_2	15	49_6	0.074_6	V, VII		(9, 19)
	O_2	15	48_7	0.073_2	V, VII		(9, 19)
	O_2	For effect of time, *v.* Fig. 2					
	H_2O	*v.* Fig. 1					
	SO_2	15	43_7 (Initial)		VII		(9, 16, 19)
			36_5 (10 min)				
			33_7 (24 hr)				
	NH_3	15	45_0 (Initial)		VII		(9, 16, 19)
			42_1 (10 min)				
			41_6 (1 hr)				
			38_9 (24 hr)				
	CO_2	15	46_5		V, VII		
K	CO_2	62	411		II	CHD	(12)
Na	CO_2	90	294		II	CHD	(12)
	Vac.	100	222		VII	Ed.	(22)
	Vac.	250	211		VII	Ed.	(22)
Pb†	H_2	366–522	$\gamma = 444 - 0.077(t - 327)$; $a^2 = 0.0846 - 0.0_537(t - 327)$		VIII	OFH	(7)
	H_2	350	453		III	LLB	(24)
	H_2	350–982	$\Delta\gamma/\Delta t = -0.062$		III	LLB	(24)
	H_2	750	423		III	LLB	(17)
	H_2	750–1036	$d\gamma/dt = -0.096$		III	LLB	(17)
	CO	770–780	425		I		(18)
Pt	Air	2000	181_9		II	TKR	(11)
Sb†	H_2	640	350		III	LLB	(24)
	H_2	640–970	$\Delta\gamma/\Delta t = -0.025$		III	LLB	(24)
	H_2	750	368		III	LLB	(17)
	H_2	750–1100	$d\gamma/dt = -0.063$		III	LLB	(17)
	CO	840–850	274		I	OFH	(18)
Sn†	H_2	319–396	$\gamma = 531 - 0.080(t - 232)$; $a^2 = 0.154_5 - 0.0_571(t - 232)$		VIII	OFH	(7)
	H_2	253	526		III	LLB	(24)
	H_2	253–964	$\Delta\gamma/\Delta t = -0.018$		III	LLB	(24)
	H_2	878	508		III	LLB	(17)
	H_2	878–1050	$d\gamma/dt = -0.089$		III	LLB	(17)

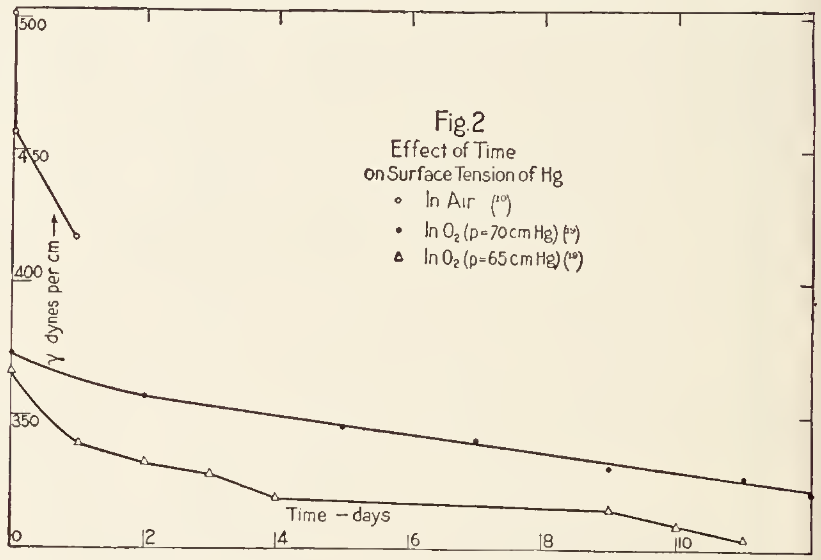

Fig. 2 Effect of Time on Surface Tension of Hg

Metal	Gas	t, °C	γ	a^2	Method (v. p. 433)	Cooperating experts	Lit.
Sn†	CO	750–910	480		I		(18)
Zn	H_2	477	753 ± 10	0.235_4	VIII	CB	(7)
		543	747 ± 10	0.235_6			
	Air	590	708 ± 40	0.22_4	I		(18)

* For a discussion of the discordant data on Hg, *v.* (21).
† For recent data on Sn, Pb, Sb and Cu, by Method (III), *v.* (25).
‡ Recent values of a^2, as given for Ag by (26) (I) in vacuum:

t, °C	a^2	t, °C	a^2
1000	0.201	1214	1.184
1060	0.193	1272	0.180
1122	0.187	1327	0.178

Alloys

Pb-Sn (23). Bi-Sn, Bi-Pb, Cu-Sn, Cu-Sb (17, 25). Cast iron (25)

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SURFACE TENSION AND RELATED PROPERTIES FOR TEMPERATURES BELOW 0°C*

J. E. Verschaffelt

Unless otherwise stated, $g = 980$ and the liquid is in contact with its own vapor. For abbreviations and equations, v. p. 433, 434.

A-Table.—Elementary Substances and Atmospheric Air

A, Argon (1) (I). $A_K = 29_2$; $\alpha = 39$; $n = 1.3_1$; $k_E = 2.0$

T, °K	a^2	$\gamma \pm 1\%$	γ_M
85.0	0.0190	13.2	122
90.0	0.0177	11.9	112

Cl_2, Chlorine†‡ (8) (I). $A_C = 26_3$; $\alpha = 69$; $k_E = 2.1$; $n = 1.1_3$

t, °C	a^2	$\gamma \pm 1\%$	γ_M
−30	0.0336	25.4	327
−35	.0345	26.4	337
−40	.0355	27.3	347
−45	.0364	28.3	358
−50	.0373	29.2	368
−55	.0383	30.2	379
−60	.0392	31.2	389

H_2, Hydrogen (9) (I, $g = 981.2$). $\alpha = 5.52$; $A_K = 45.5_3$; $k_E = 1.36$; $n = 1.11$

T, °K ± 0.02°	a^2	$\gamma \pm 0.1\%$	γ_M
20.40	0.05612	1.912	17.83
18.70	.06238	2.197	20.14
17.99	.06500	2.318	21.11
16.16	.07186	2.633	23.60
14.68	.07700	2.882	25.53

He, Helium (13) (I). $A_K = 5.2$; $k_E = 1.0$ (from 4.2 to 2.4°K); $\alpha = 0.63$; $n = 1.1_3$ (from 4.2 to 3.0°K)

T, °K ± 0.02°	a^2	$\gamma \pm 1\%$	γ_M
4.20	0.00181	0.098	0.98
4.00	.00211	.120	1.19
3.50	.00280	.177	1.68
3.00	.00350	.239	2.19
2.50	.00419	.296	2.69
2.00	.00477	.339	3.08
1.50	.00496	.353	3.22

N_2, Nitrogen† (1) (I). $A_K = 24_9$; $\alpha = 27.5$; $k_E = 2.0_0$; $n = 1.21_5$

T, °K	a^2	$\gamma \pm 1\%$	γ_M
70.0	0.0255	10.53	108.7
75.0	.0234	9.39	98.7
80.0	.0213	8.27	88.7
85.0	.0192	7.20	78.7
90.0	.0171	6.16	68.7

Ne, Neon (14) (I). $A_K = 85.5$; $k_E = 2.0$; $\alpha = 14.7$; $n = 1.20$

24	0.0095	5.90	37.5
25	.0091	5.50	35.5
26	.0086	5.15	33.5
27	.0082	4.80	31.5
28	.0077	4.45	29.5

O_2, Oxygen† (1) (I). $A_K = 29_5$; $\alpha = 37.7$; $k_E = 1.9_2$; $n = 1.20_5$

70.0	0.0302	18.3	160
75.0	.0286	17.0	151
80.0	.0269	15.7	141
85.0	.0253	14.5	132
90.0	.0237	13.2	122

Liquid Air, 65% O_2 (in contact with the atmosphere)† (12) (III)

t, °C	a^2	$\gamma \pm 1\%$
−190.5 (B. P.)	0.0243	12.2

B-Table.—Chemical Compounds, Standard Arrangement

NOCl, Nitrosyl chloride (2) (I). $A_C = 39_2$; $\alpha = 68$; $k_E = 1.4_6$; $n = 0.8_6$

t, °C ± 0.1°	a^2	$\gamma \pm 1\%$	γ_M
−33.0	0.049	34.5	441
−22.0	.047	33	424
− 5.5	.046	30	400

CO, Carbon monoxide (1) (I). $A_K = 26_5$; $\alpha = 30.0$; $k_E = 2.0_0$; $n = 1.22_5$

T, °K	a^2	$\gamma \pm 1\%$	γ_M
70.0	0.0292	12.11	124.7
75.0	.0271	10.96	114.7
80.0	.0249	9.83	104.7
85.0	.0228	8.74	94.7

CO_2, v. p. 447.

C_2H_2, Acetylene (11) (I). $A_C = 35$; $\alpha = 82$; $k_E = 2.4_0$; $n = 1.5_1$

t, °C	a^2	$\gamma \pm 1\%$	γ_M
−77.4	0.0604	18.0	220
−75.7	.0599	17.7	218
−70.5	.0566	16.4	204
−69.0	.0557	16.0	200
−67.0	.0548	15.6	196
−64.0	.0531	15.0	190
−62.4	.0517	14.4	184

$(CH_3)_2O$, Methyl ether (10) (I). $A_C = 24_4$; $\alpha = 63$; $k_E = 2.0_0$; $n = 1.2_7$

−40.0	0.0565	21.0	324
−30.0	.0535	19.4	304
−20.0	.0505	17.9	284
−10.0	.0475	16.4	264

$(CH_2)_2O$, Ethylene oxide (10) (I). $A_C = 37_0$; $\alpha = 74$; $k_E = 1.8_0$; $n = 1.1_3$

−50.0	0.0760	35.8	460
−40.0	.0732	34.2	442
−30.0	.0704	32.5	424
−20.0	.0676	30.8	406
−10.0	.0648	29.2	388
0.0	.0620	27.6	370
+10.0	.0592	25.9	352
20.0	.0564	24.3	334

CH_3NH_2, Methylamine (7) (III). $A_C = 26_7$; $k_E = 1.2$
Nitrogen atmosphere

−70	0.0785	29.2	347
−49	.0749	27.0	327
−20	.0681	23.6	294
−18	.0672	23.1	290
−12	.0649	22.2	280

$(CH_3)_2NH$, Dimethylamine (7) (III). $A_C = 29_6$; $k_E = 1.1_0$
Nitrogen atmosphere

−78	0.0680	25.2	384
−50	.0625	22.4	350
−23	.0584	20.2	323
0	.0543	18.1	296
+ 5	.0529	17.5	286

* Except metals, for which *see* p. 439; and except organic compounds which are liquid at 0° and 1 atm., for which *see* p. 448. † *See also* p. 442. ‡ *See also* p. 447.

$(CH_3)_3N$, Trimethylamine (7) (III). $A_C = 333$; $k_E = 1.65$
Nitrogen atmosphere

t, °C	a^2	$\gamma \pm 1\%$	γ_M
−73	0.0676	24.8	457
−52	.0620	22.2	417
−32	.0588	20.2	388
−19	.0557	18.7	363
− 4	.0524	17.4	339

$C_2H_5NH_2$, Ethylamine (7) (III). $A_C = 339$; $k_E = 1.25$
Nitrogen atmosphere

t, °C	a^2	$\gamma \pm 1\%$	γ_M
−74	0.0751	28.9	430
−33	.0668	24.3	376
−21.5	.0650	23.2	363
0	.0614	21.3	339
+ 9.9	.0594	20.3	327

METHOD IV

Substance	t, °C	a^2	$\gamma \pm 1\%$	γ_M	k_E*	Lit.
Cl_2	− 72	0.0410	33.0	407	1.89	(4)
N_2	−196.0	0.0219	8.7	93	1.90	(7)
O_2	−182.9	0.0235	13.2	122	1.91	(7)
SO_2	− 25	0.0442	32.6	397	2.18	(4)
N_2O	− 89.3	0.0438	26.3	286	2.28	(6)
NH_3	− 29	0.125	41.2	356	2.21	(4)
Air	−190.3	0.0235	Approx. independent of composition†			(5)
Pictet's liquid	− 33	0.047	35	Composition 1 mole CO_2+ 1 mole SO_2		(4)
	− 60	0.049	38			

* Assuming γ_M to vary linearly with T up to T_c.
† γ at the B. P. for liquid air of any composition may be calculated by substituting values of d_l and d_v in equation (2), p. 434.

LITERATURE

(For a key to the periodicals see end of volume)

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SURFACE TENSIONS OF FUSED SALTS ABOVE 200°C AND LIQUIDS ABOVE 360°C*

ALLAN FERGUSON

𝔅-TABLE.—CHEMICAL COMPOUNDS, STANDARD ARRANGEMENT
For abbreviations and symbols, *v.* p. 433

S: In air (4) (I)

t, °C	d_4^t	γ	γ_M
445.0	1.605	38.97	456

$BiCl_3$: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
271	3.811	66.2	1254
304	3.735	61.8	1187
331	3.682	58.1	1127
353	3.621	55.3	1084
382	3.554	52.0	1032

$BiBr_3$: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
250	4.598	66.5	1408
281	4.525	63.6	1361
299	4.471	61.6	1328
320	4.416	59.5	1294
346	4.348	56.7	1246
370	4.286	53.8	1191
389	4.237	52.0	1162
417	4.164	48.9	1106
442	4.099	46.2	1056

$SnCl_2$: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
307	3.289	97.0	1449
328	3.263	96.2	1445
361	3.222	93.9	1422
377	3.202	92.0	1402
405	3.166	89.0	1364
430	3.135	86.4	1333
452	3.108	83.9	1302
480	3.072	81.6	1277

$PbCl_2$: In air (5) (I)

t, °C	γ	t, °C	γ
490	138	541	130
500	137	552	129
518	135	571	128
526	134	590	127
539	131	614	126

* Except metals, for which *see* p. 439; organic subtances, *see* p. 448; industrial materials, *see* Vol. II; and fused salts melting below 200°C, *see* p. 447.

$TlNO_3$: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
210	4.899	117.3	1682
245	4.838	115.2	1666
264	4.806	113.8	1653
285	4.768	112.0	1635
312	4.721	109.8	1614
339	4.674	107.4	1589
364	4.630	105.2	1566
389	4.586	102.8	1540
430	4.515	99.5	1507

AgCl: In air (7) (I)

t, °C	γ	t, °C	γ
452	125.5	517	119.6
468	124.3	532	116.3
472	123.6	558	114.3
488	122.4	568	113.4
494	121.6	573	112.8

AgBr: In air (2)

t, °C	d_4^t	γ	γ_M
M. P.		121.4	

$CaCl_2$: In air (8) (II)

t, °C	d_4^t	γ	γ_M
M. P.		152	

$BaCl_2$: In air (8) (II)

t, °C	d_4^t	γ	γ_M
M. P.		171	

LiF: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
868.5	1.789	249.5	1485
897.6	1.775	248.0	1484
944	1.753	242.3	1462
985	1.734	238.3	1449
1029	1.713	233.5	1431
1065	1.696	229.8	1418
1117	1.672	222.7	1387
1156	1.653	217.4	1364
1208	1.629	210.6	1335
1270	1.599	201.1	1290

LiCl: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
614	1.496	137.8	1282
640	1.483	135.4	1267
680	1.466	132.9	1263
735	1.443	128.8	1256
776	1.425	125.8	1237
814	1.409	123.2	1193
860	1.389	119.9	1172
915	1.365	116.1	1148
968	1.342	112.6	1126
1022	1.319	108.5	1098
1075	1.296	104.8	1073

Li_2SO_4: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
860	2.004	223.8	3231
874	1.999	223.1	3227
897	1.989	221.8	3219
923	1.978	220.2	3207
963	1.962	217.4	3183
977	1.956	216.4	3175
1001	1.947	214.8	3161
1039	1.932	212.3	3141
1057	1.924	211.0	3130
1074	1.917	209.8	3120
1090	1.911	208.8	3111
1112	1.901	207.3	3100
1157	1.884	204.2	3072
1168	1.879	203.4	3066
1184	1.873	202.4	3057
1192	1.869	201.8	3052
1214	1.860	200.3	3039

$LiNO_3$: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
359	1.723	111.5	1305
403	1.699	109.1	1288
418	1.690	108.4	1285
445	1.676	106.0	1264
493	1.650	102.3	1232
555	1.616	99.0	1209
609	1.586	96.2	1189

Li_2SiO_3: In N_2 (3) (III)

t, °C	γ	t, °C	γ
1254	374.6	1479	352.8
1380	358.2	1550	348.7
1421	356.2	1601	346.6

$LiBO_2$: In N_2 (3) (III)

t, °C	γ	t, °C	γ
879	261.8	1198	239.7
922	259.7	1249	234.2
968	256.2	1309	225.8
1012	253.1	1355	220.7
1055	250.3	1408	212.7
1097	247.7	1457	203.1
1150	243.6	1520	192.4

NaF: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
1010	1.936	199.5	1552
1053	1.912	195.5	1533
1097	1.887	191.2	1513
1147	1.859	185.8	1485
1189	1.835	180.5	1455
1234	1.810	176.4	1435
1263	1.794	173.1	1417
1313	1.766	167.5	1385
1357	1.741	162.9	1360

NaF.—(*Continued*)

t, °C	d_4^t	γ	γ_M
1405	1.714	157.8	1331
1456	1.685	152.5	1301
1497	1.662	148.7	1281
1546	1.634	143.5	1250

NaCl: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
803	1.547	113.8	1282
811	1.542	113.5	1281
821	1.536	112.9	1278
832	1.529	111.9	1270
859	1.512	109.9	1257
883	1.497	108.2	1245
908	1.482	106.4	1233
931	1.467	104.5	1219
961	1.449	102.7	1208
996	1.427	99.7	1185
1037	1.401	97.0	1167
1080	1.374	94.0	1146
1122	1.347	91.3	1128
1172	1.316	88.0	1104
M. P.		113.3*	

NaBr: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
761	2.320	105.8	1326
810	2.284	102.9	1303
852	2.250	99.6	1274
897	2.211	96.2	1245
942	2.169	92.9	1218
985	2.125	90.0	1196
1029	2.078	86.2	1163
1074	2.026	84.0	1152
1116	1.974	81.1	1131
1166	1.912	78.0	1112
M. P.		102.8*	

NaI: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
706	2.692	85.6	1248
746	2.649	83.9	1237
816	2.575	80.5	1209
861	2.527	77.6	1180
M. P.		93.9*	

Na_2SO_4: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
900	2.061	194.8	3275
945	2.039	189.3	3205
990	2.017	188.2	3210
1032	1.997	186.5	3202
1077	1.971	184.7	3199

$NaNO_3$: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
322	1.900	119.7	1509
355	1.877	118.1	1501
397	1.850	115.9	1487
427	1.829	114.2	1476
466	1.803	111.8	1459
513	1.771	108.9	1438
559	1.740	105.9	1415
602	1.711	103.4	1397
656	1.675	99.4	1364
693	1.650	96.8	1340
738	1.620	93.7	1313
329	1.895	110.8	In air (1)
405	1.846	106.5	In air (1)

* In air (8) (II).

$NaPO_3$: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
827	2.181	197.5	2565
871	2.162	194.8	2544
927	2.137	191.6	2522
1014	2.099	186.7	2487
1099	2.062	181.6	2448
1181	2.025	176.6	2409
1265	1.989	170.9	2358
1317	1.966	166.7	2318
1434	1.914	156.2	2213
1517	1.878	147.5	2116

CH_3CO_2Na: In air (8) (II)

M. P.		38.8	

Na_2MoO_4: In N_2 (3) (III)

699	2.796	214.0	3761
729	2.777	210.0	3707
751	2.763	208.1	3686
777	2.747	204.9	3644
819	2.720	202.4	3623
859	2.695	199.0	3584
904	2.667	195.4	3544
948	2.639	191.4	3496
990	2.613	187.7	3451
1035	2.584	184.1	3410
1079	2.557	181.2	3380
1122	2.530	178.8	3359
1172	2.499	176.1	3335
1212	2.473	174.6	3330

Na_2WO_4: In N_2 (3) (III)

710	3.893	203.3	3632
741	3.860	201.0	3612
788	3.812	198.2	3591
834	3.765	195.2	3566
879	3.721	191.5	3526
932	3.671	189.5	3521
985	3.623	184.2	3452
1039	3.576	181.4	3430
1081	3.541	178.3	3393
1133	3.499	174.6	3350
1181	3.461	172.4	3332
1232	3.424	168.0	3270
1282	3.390	163.8	3209
1332	3.355	160.6	3168
1391	3.318	155.0	3080
1450	3.282	152.0	3043
1517	3.245	147.3	2971
1559	3.224	144.0	2917
1595	3.208	142.6	2899

$NaBO_2$: In N_2 (3) (III)

t, °C	γ	t, °C	γ
1016	193.7	1234	159.7
1052	188.3	1277	150.8
1097	180.9	1323	142.9
1140	174.7	1372	135.1
1192	166.1	1441	126.2

KF: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
913	1.869	138.4	1368
962	1.837	135.2	1352
1015	1.801	131.0	1328
1062	1.770	127.4	1306
1097	1.749	124.5	1287

KF.—(*Continued*)

t, °C	d_4^t	γ	γ_M
1147	1.713	119.9	1256
1185	1.689	116.1	1228
1234	1.654	112.3	1205
1275	1.627	108.6	1178
1310	1.604	104.9	1148

KCl: In N_2 (3) (III)

800	1.509	95.8	1290
827	1.492	94.0	1275
862	1.470	91.3	1251
885	1.456	89.7	1237
909	1.442	88.0	1221
941	1.421	85.8	1203
986	1.396	82.2	1166
1029	1.370	79.1	1136
1054	1.355	77.2	1117
1088	1.335	75.2	1099
1104	1.326	73.7	1082
1125	1.313	72.5	1070
1167	1.287	69.6	1042
M. P.		98.4*	

KBr: In N_2 (3) (III)

775	2.086	85.7	1270
798	2.068	83.8	1249
826	2.045	82.0	1231
859	2.019	79.5	1204
887	1.997	77.8	1187
920	1.970	75.4	1161
M. P.		91.0*	

KI: In N_2 (3) (III)

737	2.392	75.2	1270
764	2.364	72.1	1227
812	2.314	69.2	1195
866	2.257	66.8	1173
873	2.250	66.5	1170
M. P.		83.5*	

K_2SO_4: In N_2 (3) (III)

1070	1.888	143.7	2935
1103	1.870	142.6	2931
1145	1.848	140.6	2913
1199	1.818	136.7	2863
1247	1.792	132.7	2806
1306	1.760	128.8	2757
1347	1.737	126.2	2725
1372	1.724	124.6	2704
1400	1.709	122.4	2672
1440	1.687	119.8	2637
1463	1.674	118.1	2613
1490	1.660	116.1	2584
1530	1.637	114.1	2563
1586	1.607	110.7	2517
1656	1.569	106.8	2468

KNO_3: In N_2 (3) (III)

380	1.837	110.4	1597
436	1.794	106.0	1558
480	1.760	102.8	1531
534	1.719	98.5	1489
578	1.685	95.2	1459
628	1.647	91.6	1426
675	1.611	87.9	1389
722	1.575	84.0	1349
772	1.537	80.2	1307
349	1.869	106.4	} In air (1) (I)
414	1.764	100.7	

* In air (8) (II).

KPO_3: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
897	2.069	155.5	2304
942	2.049	151.8	2264
996	2.027	149.0	2238
1036	2.010	146.1	2207
1082	1.983	143.0	2180
1120	1.973	140.3	2146
1167	1.953	136.8	2106
1205	1.938	133.5	2066
1250	1.918	130.2	2029
1288	1.901	126.3	1980
1345	1.877	122.5	1937
1372	1.865	118.5	1882
1413	1.848	114.7	1832
1497	1.812	105.5	1708
1536	1.795	100.3	1634

KCN: In air (8) (II)

M. P.		96.1	

$PbCl_2.KCl$: In air (6) (I)

t, °C	γ	t, °C	γ
471	105	555	97.9
502	103	582	95.1
522	102	592	94.7
529	101	602	94.4
538	100	616	94.4
547	99.2		

$PbCl_2.KCl$: In liquid Pb (6) (I)

453	230	531	216
467	228	542	214
494	223	546	212
509	219	599	199
526	220		

$K_2Cr_2O_7$: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
420	2.271	140.1	
454	2 248	139.4	3593
480	2.229	138.4	3588
504	2.213	137.0	3568
535	2.191	135.0	3540

K_2MoO_4: In N_2 (3) (III)

931	2.362	150.5	3261
977	2.334	147.3	3217
1021	2.307	145.2	3196
1105	2.255	140.7	3144
1143	2.230	138.6	3120
1189	2.200	135.5	3078
1273	2.144	130.0	3004
1356	2.087	123.6	2908
1438	2.029	118.0	2829
1453	2.018	116.9	2813
1522	1.959	112.5	2761

K_2WO_4: In N_2 (3) (III)

925	3.175	161.0	3531
969	3.139	154.1	3406
1013	3.103	150.2	3346
1052	3.071	145.9	3275
1097	3.035	141.9	3207
1139	3.002	138.0	3143
1183	2.968	134.1	3076
1230	2.933	130.3	3013
1284	2.893	124.6	2908

K_2WO_4.—(*Continued*)

t, °C	d_4^t	γ	γ_M
1322	2.866	120.9	2839
1367	2.834	118.4	2802
1409	2.805	114.3	2723
1458	2.771	110.0	2642
1489	2.751	107.9	2605
1520	2.730	105.6	2560

KBO_2: In N_2 (3) (III)

992		123.5	
1036		112.3	
1091		103.0	
1142		96.6	

RbF: In N_2 (3) (III)

803	2.894	127.2	1389
847	2.851	121.3	1338
887	2.812	116.7	1299
936	2.763	113.0	1273
986	2.711	108.9	1242
1037	2.657	105.2	1216
1085	2.605	102.2	1197

RbCl: In N_2 (3) (III)

750	2.088	95.7	1433
770	2.072	94.2	1417
828	2.024	89.0	1360
880	1.981	84.5	1310
923	1.946	81.1	1272
933	1.937	79.9	1257
962	1.914	77.3	1226
994	1.887	74.7	1196
1037	1.852	71.3	1156
1089	1.809	66.7	1099
1150	1.759	61.4	1035

RbBr: In N_2 (3) (III)

729	2.656	87.7	1378
779	2.601	84.1	1340
831	2.542	80.7	1305
884	2.486	77.2	1267
944	2.421	73.1	1222
986	2.375	70.2	1188
1041	2.318	66.7	1147
1121	2.226	60.6	1071

RbI: In N_2 (3) (III)

673	2.827	79.4	1414
722	2.774	75.8	1367
772	2.719	72.2	1319
822	2.663	68.5	1269
869	2.611	65.1	1222
918	2.557	61.6	1173
968	2.501	58.3	1126
1016	2.448	55.4	1086

Rb_2SO_4: In N_2 (3) (III)

1086	2.538	132.5	2953
1112	2.521	129.7	2903
1145	2.499	127.3	2866
1195	2.466	124.2	2821
1235	2.440	121.8	2786
1289	2.403	118.9	2748
1344	2.367	116.0	2708
1397	2.331	113.8	2684
1415	2.319	113.1	2676
1482	2.275	110.9	2658
1545	2.233	108.9	2643

$RbNO_3$: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
327	2.467	107.5	1643
376	2.419	104.0	1611
428	2.368	99.8	1568
480	2.318	96.1	1531
527	2.272	92.5	1494
578	2.222	88.9	1457
625	2.177	85.6	1422
676	2.127	81.4	1373
726	2.078	77.7	1332

CsF: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
723	3.583	104.5	1270
769	3.526	101.0	1241
826	3.456	96.4	1200
877	3.392	92.3	1164
930	3.327	88.1	1125
985	3.259	84.3	1091
1042	3.189	81.3	1068
1100	3.117	78.9	1052

CsCl: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
664	2.772	89.2	1378
717	2.714	85.9	1346
771	2.655	81.9	1302
830	2.592	77.7	1255
881	2.537	73.7	1208
934	2.479	69.7	1160
979	2.421	66.4	1123
1035	2.370	61.6	1056
1080	2.332	56.3	976

CsBr: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
658	3.116	81.8	1366
694	3.066	78.9	1333
753	2.990	74.9	1286
808	2.915	71.6	1250
858	2.846	68.5	1216
916	2.769	65.5	1184
971	2.695	62.7	1154

CsI: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
654	3.158	73.1	1383
713	3.086	68.8	1321
768	3.018	65.7	1281
821	2.953	62.5	1236
879	2.883	59.2	1187
926	2.826	56.6	1153
980	2.760	53.8	1113
1030	2.699	51.1	1073

Cs_2SO_4: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
1036	3.037	111.3	2694
1063	3.018	108.2	2630
1105	2.988	105.0	2570
1165	2.937	100.8	2495
1221	2.889	97.3	2435
1275	2.841	94.7	2397
1331	2.787	91.7	2351
1372	2.743	89.8	2326
1423	2.690	87.4	2294
1470	2.636	85.5	2275
1530	2.566	83.0	2248

$CsNO_3$: In N_2 (3) (III)

t, °C	d_4^t	γ	γ_M
426	2.796	91.8	1554
460	2.758	88.2	1507
511	2.700	83.7	1451
577	2.627	79.2	1398
602	2.599	76.3	1356
686	2.505	72.5	1321

LITERATURE

(For a key to the periodicals see end of volume)

(1) Bottomley, *4*, **83**: 1421; 03. (2) Gradenwitz, *8*, **67**: 467; 99. (3) Jaeger, *93*, **101**: 1; 17. (4) Kellas, *4*, **113**: 903; 18. (5) Lorenz and Kaufler, *25*, **41**: 3727; 08. (6) Lorenz and Liebmann, *7*, **83**: 459; 13. (7) Lorenz, Liebmann and Höchberg, *93*, **94**: 301; 16. (8) Motylewski, *93*, **38**: 4[illegible]; 04.

SURFACE-TENSION DATA FOR CERTAIN PURE LIQUIDS BETWEEN 0 AND 360°C AND FOR ALL TYPES OF SOLUTIONS AT ALL TEMPERATURES

T. Fraser Young and William D. Harkins*

LIQUID—GAS INTERFACE

For abbreviations and symbols, *v*. p. 433

The greater part of the surface-tension values listed in the following tables have been corrected, in so far as possible, to agree with certain "standard" values for water and for benzene (C_6H_6) as determined by the capillary-height method. As the primary standard, the value of γ for water is taken as equal to 72.75 ± 0.05 dyne/cm at 20° in the presence of air at ordinary pressure. The values used in selecting this standard are those of Richards and Coombs, 1915, corrected 1921 (64) 72.72; Harkins and Brown, 1919 (40) 72.80; Richards and Carver, 1921 (63) 72.73; and Young and Gross (for these tables) 72.80. So far as is known all of these values have been determined with about the same degree of precision, and also with the same order of accuracy with respect to known errors.

The "standard" value for benzene in air at 20° is 28.88 ± 0.03, and is based on the work of Richards and Coombs (64), Richards and Carver (63) and Harkins and Brown (40).

* Assisted by P. L. K. Gross, Ben. H. Nicolet, Leslie Hellerman, B. R. Mortimer, David M. Gans, L. H. Chêng, O. G. Vogel, A. W. Meyer, W. E. Vaughan, B. Ginsberg, E. H. Robinson, and C. M. Marberg.

A-B Table

H_2O (I, II, III, IX) (19, 45, 61, 63, 64, 66, 75, 77, 78, 97, 98, 99, 100, 101)

t, °C	γ (air)	a^2 (air)
−8	76.96 ± 0.3	0.1574
−5	76.42 ± 0.2	.1562
0	75.64 ± 0.1	.15448
+5	74.92 ± 0.1	.15299
10	74.22 ± 0.05	.15160
11	74.07 ± 0.05	.15131
12	73.93 ± 0.05	.15103
13	73.78 ± 0.05	.15075
14	73.64 ± 0.05	.15048
15	73.49 ± 0.05	.15019
16	73.34 ± 0.05	.14991
17	73.19 ± 0.05	.14963
18	73.05 ± 0.05	.14937
19	72.90 ± 0.05	.14909
20	72.75 ± 0.05	.14881
21	72.59 ± 0.05	.14852
22	72.44 ± 0.05	.14824
23	72.28 ± 0.05	.14795
24	72.13 ± 0.05	.14768
25	71.97 ± 0.05	.14738
26	71.82 ± 0.05	.14711
27	71.66 ± 0.05	.14683
28	71.50 ± 0.05	.14654
29	71.35 ± 0.05	.14627
30	71.18 ± 0.05	.14597
35	70.38 ± 0.05	.14456
40	69.56 ± 0.05	.14313
45	68.74 ± 0.05	.14173
50	67.91 ± 0.05	.14032
55	67.05 ± 0.05	.13887
60	66.18 ± 0.05	.13741
70	64.42 ± 0.1	.13449
80	62.61 ± 0.1	.1315
90	60.75 ± 0.2	.1284
100	58.85 ± 0.2	.1253
	γ (vapor)	k_E
110	56.89 ± 0.2	1.27
120	54.89 ± 0.2	
130	52.84 ± 0.3	
25		1.03
70		1.07
100		1.18

H_2O_2 (I) (33)

t, °C	γ (air) ± *ca.* 0.5
0.2	78.9
6.2	77.9
11.0	77.7
13.9	76.6
18.2	76.1

Br_2 (I, II) k_E = 2.0 (22, 40, 57, 73)

t, °C	γ (air or vapor) ±0.7
0	45.0
20	41.5
50	36.2

Cl_2 (I) (35); *v. also* p. 441

t, °C	γ††
0	21.7
10	20.0
20	18.4
30	16.7
40	15.1
50	13.4

$\gamma = 72(1 - T/T_C)^{1.18}$

SO_3 (I) (68); *cf.* (5)

t, °C	γ‡‡
17.5	33.1
35.3	30.3
60.4	25.7
78.3	22.3
100.0	17.8

S_2Cl_2 (I) k_E = 2.2 (61)

t, °C	γ ±1.0
15.5	43.8
46.3	39.3
78.3	35.0

SCl_2O (I, III) (61, 82)

t, °C	γ (air or vapor) ±1.5
20	33.1
50	28.8

SCl_2O_2 (III) (82)

t, °C	γ (air)*
13	35.26
23.5	32.92
47.5	28.40

* The results of (61) are 2 to 5 dyne/cm lower.

$SOBr_2$ (I) (36)

t, °C	γ (?)††
17	45.0
25	44.4

Se (II) (57)

t, °C	γ (air)
217	92.4 ± 20

N_2O (I) (84)

t, °C	γ§
−25	10.10
+10	3.37
15	2.52
20	1.75
25	1.07

$$\gamma = 86\left(1 - \frac{T}{T_C}\right)^{1.33}$$

N_2O_4 (I) k_E = 2.2 (61)

t, °C	γ ±1.0
1.6	30.6
19.8	27.5

NH_3 (I) k_E = 1.3 (4)

t, °C	γ ± 2.0
11.1	23.4
34.1	18.1
59.0	13.0

For notes †–§§ *see* p. 475.

P_2O_3 (I) k_E = 2.3 (71)

t, °C	γ‡‡
34.3	36.6
60.25	33.2
78.95	31.4
109.4	27.8

PCl_3 (I, II) k_E = 2.2 (14, 40, 61, 73)

t, °C	γ (air or vapor) ±0.5
15	29.7
20	29.1
50	25.2
75	22.0

PCl_5 (I) γ (vapor) (95)

$POCl_3$ (I, III) k_E = 2.2 (61, 73, 82)

t, °C	γ ±0.3 (air)	γ ±0.5 (vapor)
10	33.4	33.4
20	32.2	32.2
30	30.9	30.9
50	28.4	28.4
65	26.5	26.5
85	24.1	24.1

PBr_3 (III) (82)

t, °C	γ (air) ±1§§
24	45.8
33	44.1
59.5	38.4
72	37.1

PI_3 (III) (30)

t, °C	γ (N_2) ±2†
75.3	56.5
121.4	53.6
150	51.4

$PSCl_3$ (I) (73)

$a^2 = 4.4496 - 0.01199t$; at 125°C, γ = 21.1

t, °C	a^2 ±2%
9.0	0.04341
61.7	.03710
65.8	.03660
72.0	.03586

$AsCl_3$ (III) (30)

t, °C	γ (N_2) ±2†
−21	43.8
+50.2	36.6
110	31.0

$AsBr_3$ (III) (30)

t, °C	γ (N_2) ±2†
49.6	49.6
121	41.0
179.7	36.1

$SbCl_3$ (III) (95)

t, °C	γ (air) +1.0§§
109.5	44.51
127.5	41.84
148.5	39.43
166.5	37.38

$SbCl_5$ (III) γ (air) (95)

CO_2 (I) (84, 85)

t, °C	γ§
−25	9.13
0	4.49
+10	2.73
15	1.90
20	1.16
25	0.52
30	0.06

$$\gamma = 75\left(1 - \frac{T}{T_C}\right)^{1.25}$$

CCl_4 (I, II) (18, 19, 21, 23, 51, 58, 60, 63, 89)

t, °C	γ (air)	γ (vapor)
10	28.00±0.1	28.22±0.2
20	26.77±0.1	26.95±0.1
30	25.53±0.1	25.70±0.2
50	23.14±0.2	23.22±0.2
75	20.19±0.2	20.20±0.2
100		17.26±0.2
150		11.66±0.2
200		6.53±0.2
250		2.11±0.2
270		0.68±0.2

γ (vapor) $= 67.671\left(1 - \frac{T}{556.25}\right)^{1.23}$ ±0.2, 10 to 270°C, k_E = 2.21 from 10 to 100°C; = 2.2 from 10 to 220°C. At 20°C, a^2 (air) = 0.03426. γ (vapor) − γ (air) = 0.18.

CCl_2O (I) k_E = 2.1 (54)

t, °C	γ††
16.7	20.1
34.5	17.6
46.1	15.9

CS_2 (I, II, III, IX) k_E = 2.1 (40, 51, 58, 59, 73, 75, 91, 94)

t, °C	γ (air or vapor) ±0.3
0	35.28
10	33.81
20	32.33
45	28.66
60	26.45

CCl_3NO_2, Chloropicrin (I, II) (26, 73)

t, °C	γ (air or vapor) ±0.6
10	33.7
20	32.3
95	22.4

For other C-compounds, *v.* p. 448.

$SiCl_4$, Silicon tetrachloride (I) k_E = 2.1 (61)

t, °C	γ ±1.0
18.9	16.9
45.5	14.1

C_4O_4Ni, Nickel tetracarbonyl (I) k_E = 2.4 (61)

t, °C	γ ±1.0
19.8	14.7
45.9	11.8

𝕮-Table, the 𝕮-Arrangement

For abbreviations and symbols, v. p. 433

$CHBrCl_2$, Dichlorobromomethane (I) k_E = 2.1 (90)

t, °C	γ (air) ±0.3
22.5	32.25
44.0	29.36
61.5	27.11
84.5	24.22

$CHBr_3$, Bromoform (I, II) (14, 25)

t, °C	a^2 (air) ±0.001
55	0.0265
120	0.0211
t, °C	γ (air) ±0.3
20	41.53

$CHCl_3$, Chloroform (I, II, III) k_E = 2.1 (23, 51, 58, 59, 63, 72, 91)

t, °C	γ	γ (air)
10	28.60±0.2	28.50±0.2
20*	27.24±0.1	27.14±0.1
60	21.73±0.2	21.73±0.2
77.5	19.40±0.3	

* At 20°C, a^2 (air) = 0.03722; γ(vapor) − γ(air) = +0.10.

HCN, Hydrogen cyanide (I, II) k_E = 1.1 (8)

t, °C	γ (air)††
10	19.1
17	18.2
25	17.2

CH_2BrNO_2, Bromonitromethane (III) (30)

t, °C	γ (N_2) ±2†
−18.5	48.3
+80	36.4
135.8	28.6

CH_2Cl_2, Methylene chloride (II) (23)

At 20°C, γ (air) = 26.52 ± 0.2

CH_2I_2, Methylene iodide (II) (25)

At 20°C, γ (air) = 50.76 ± 0.3

CH_2O_2, Formic acid (I, II) k_E = 0.9 (30, 31, 46, 50, 61, 73)

t, °C	γ (air)
10	38.7±0.5
20	37.6±0.5
50	34.4±0.5
100	29.0±1.0

CH_3Cl, Methyl chloride (I) (86)

t, °C	γ§
0	19.5
10	17.8
20	16.2

$$\gamma = 72\left(1 - \frac{T}{Tc}\right)^{1.22}$$

CH_3I, Methyl iodide (I) (73)

At 2.5°C, a^2 (air) = 0.02960 ± 2%; at 43.5°C, a^2 (air) = 0.02532 ± 2%, γ (air) = 25.8

CH_3NO, Formamide (I, II) k_E = 0.7 (50, 83, 87)

t, °C	γ (air) ±0.4
0	59.9
20	58.2
50	55.7
75	53.3

CH_3NO_2, Nitromethane (I, II) (23, 50, 73)

t, °C	γ (air)
0	39.8 ±0.2
20	36.82±0.1
45	33.4 ±0.2
100	26.1 ±0.3

CH_4O, Methyl alcohol (I, II) (45, 46, 48, 60, 64)

t, °C	γ (air)
0	24.49±0.2
20	22.61±0.1
30	21.75±0.2
50	20.14±0.2

t, °C	γ ±0.2	k_E
70	18.51	0.9
100	15.67	1.0
150	10.42	1.3
200	4.41	1.7
235	0.34	

From 70 to 235°C, $\gamma = 173.245\left(1 - \frac{T}{513.1}\right)^{1.33} - 243.042\left(1 - \frac{T}{513.1}\right)^2 + 146.344\left(1 - \frac{T}{513.1}\right)^3$, ± 0.2.

At 20°C, d_4^{20} = 0.7918; a^2 (air) = 0.05830.

CH_4S, Methylmercaptan (I) k_E = 2.1 (6)

t, °C	γ ± < 1.5
9.8	26.44
33.3	22.42
43.5	20.73

CH_5N, Methylamine (III) (30)

t, °C	γ (N_2) ±2†
−70	29.2
−20	23.0
−12	21.7

C_2Cl_4, Tetrachloroethylene (I, II) (25, 73)

t, °C	γ (air)
10	32.8 ±0.2
20	31.74±0.1
120	21.6 ±0.4

C_2HCl_3O, Chloral (I) k_E = 2.2

t, °C	γ (61)	t, °C	γ (73)
19.4	25.34	20.0	30.01
45.8	22.18	96.5	20.38

For notes †–§§ see p. 475.

$C_2HCl_3O_2$, Trichloroacetic acid (III) (30)

t, °C	γ (N_2) ±2†
80.2	27.8
136.5	23.4
196	17.8

$C_2H_2Br_4$, 1, 1, 2, 2-Tetrabromoethane (I, II) k_E = 2.5 (23, 90)

t, °C	γ (air)
20	49.67±0.1
45	46.54±0.2
75	42.87±0.2
100	39.78±0.2

$C_2H_2Cl_2O_2$, Dichloroacetic acid (III) (30)

t, °C	γ (N_2) ± 2†
25.7	35.4
80.2	30.3
176.2	21.4

$C_2H_2Cl_4$, 1, 1, 2, 2-Tetrachloroethane (I) k_E = 2.3 (90)

t, °C	γ (air) ±0.3
22.5	36.03
40.6	33.69
60.3	31.22
76.3	29.23
92.2	27.36

C_2H_3ClO, Acetyl chloride (I) k_E = 2.1 (61)

t, °C	γ ±1.0
14.8	26.7
46.2	21.9

$C_2H_3ClO_2$, Chloroacetic acid (III) (30)

t, °C	γ (N_2) ±2†
80.2	33.3
136.2	28.1
176.3	23.5

$C_2H_3Cl_3$, 1, 1, 2-Trichloroethane (I) (73)

t, °C	a^2 (air) ±2%	γ (air)
7.1	0.04922	
114	0.03459	22.0

C_2H_3N, Acetonitrile (I, II) k_E = 1.5 (12, 39, 62, 73)

t, °C	γ (air) ± 0.1	γ (vapor)
10	30.62	30.62±0.3
20	29.30	29.30±0.3
50	25.40	25.40±0.2
90	20.21	20.21±0.2

C_2H_3NS, Methyl thiocyanate (I) (73)

a^2 = 0.07606 − 0.000186t

t, °C	a^2 ±2%	γ
9.2	0.07435	
48.5	0.06704	
60.0	0.06490	
73.5	0.06239	
133.0	0.05132	23.3

$C_2H_4Br_2$, Ethylene bromide (I, II) k_E = 2.2 (14, 21, 51, 58, 59, 65, 73)

t, °C	γ (air)	γ (vapor)
10	40.05±0.3	40.05±0.5
20	38.75±0.1	38.75±0.4
30	37.45±0.1	37.45±0.4
40	36.15±0.1	36.15±0.4
50	34.87±0.2	34.87±0.4
60	33.58±0.2	33.58±0.4
100	28.40±0.3	28.40±0.4
130	24.73±0.4	24.73±0.4

$C_2H_4Cl_2$, 1, 1-Dichloroethane (I, II) (40, 72)

t, °C	γ (air) ±0.5
35.0	23.4
57.0	20.5

$C_2H_4Cl_2$, Ethylene chloride (I, II, III) (40, 65, 72, 91, 94)

t, °C	γ (air) ±0.3
10	33.6
20	32.2
40	29.5
60	26.7
80	24.0

C_2H_4O, Acetaldehyde (I) k_E = 1.8 (32)

t, °C	γ††
0.1	23.9
10.0	22.4
20.0	21.2
29.0	20.1
43.0	18.0
50.0	17.0

$C_2H_4O_2$, Acetic acid (I, II, III) (3, 45, 46, 48, 60, 73, 91, 94)

t, °C	γ (air)	γ (vapor)
10	28.62±0.2	28.8±0.5
20	27.63±0.2	27.8±0.5
50	24.65±0.2	24.8±0.5
75	22.18±0.2	22.3±0.5
100	19.7 ±0.3	19.8±0.4
118	18.1 ±0.3	18.1±0.3
150		15.0±0.3
180		12.3±0.3
220		8.5±0.3
250		5.7±0.3
t, °C	k_E	k'_E*
20	1.3	2.0
100	1.3	2.05
150	1.35	2.15
250	1.45	2.3

* k'_E calculated for $C_4H_8O_4$.

$C_2H_4O_2$, Methyl formate (I, II) (49, 60, 73)

t, °C	γ (vapor) ±0.2	γ (air) ±0.2
0	28.30	28.00
10	26.68	26.50
20	25.08	25.00
30	23.50	23.49
50	20.40	
100	13.04	
150	6.41	

$C_2H_4O_2$.—(*Continued*)

t, °C	γ (vapor) ±0.2	γ (air) ±0.2
200	0.99	
210	0.21	

$$\gamma = 77.83\left(1 - \frac{T}{487.1}\right)^{1.23}$$

±0.2, from 50 to 214°C; k_E = 2.09 from 0 to 100°C; =2.1 from 0 to 130°C.

C_2H_5Br, Ethyl bromide (I, II) [23, 65, 73]

t, °C	γ (air or vapor)
10	25.48±0.2
20	24.15±0.2
40	21.52±0.2

$C_2H_5Cl_2OP$, Ethoxydichlorophosphine (I) [73]

a^2 = 0.04751 − 0.0001357t; γ = 19.8 at 116.5°C

t, °C	a^2 ±2%
9.1	0.04627
46.7	0.04118
51.3	0.04055
60.0	0.03937
72.5	0.03767

C_2H_5I, Ethyl iodide (I, II, III) k_E = 2.2 [18, 61, 65, 73, 91]

t, °C	γ (air) ±1	γ (vapor) ±2
10	30.6	30.6
20	29.4	29.4
50	25.6	25.6
75	22.4	22.4

C_2H_5NO, Acetamide (I) k_E = 1.2 [83]

t, °C	γ (?) ±0.5
85	39.3
95	38.4
105	37.3
120	35.7

C_2H_5NO, Acetaldoxime (I) k_E = 1.5 [11, 92]

t, °C	γ ±0.3
35	30.1
60	27.3
80	25.1
110	21.7
145	17.8

$C_2H_5NO_2$, Nitroethane (I) k_E = 1.7 [61, 73]

t, °C	γ (air or vapor) ±0.5
10	33.4
20	32.2
50	28.5
100	22.5
110	21.2

$C_2H_5NO_3$, Ethyl nitrate (I, II) [50, 73]

t, °C	γ (air or vapor) ±0.7
0	31.2
20	28.7
85	20.5

$C_2H_6N_2O$, Dimethylnitrosoamine (I, II) k_E = 1.8 [50, 83]

t, °C	γ (air or vapor) ±0.5
20	38.9
40	36.4
75	31.8

C_2H_6O, Ethyl alcohol (I, II, IX) [45, 46, 48, 59, 60, 62, 64, 75]

t, °C	γ (air)	γ (vapor)	k_E
0	24.05±0.2		
10	23.14±0.1	23.61±0.3	
20	22.27±0.1	22.75±0.3	1.0
30	21.43±0.1	21.89±0.3	
40	20.60±0.2	21.02±0.3	
50	19.80±0.2	20.14±0.3	
60	19.01±0.2	19.24±0.3	
70	18.22±0.2	18.34±0.3	
100		15.47±0.2	1.3
150		10.16±0.2	1.7
200		4.26±0.2	2.1
240		0.13±0.2	

$$\gamma = \left[230.564\left(1 - \frac{T}{516.2}\right)^{1.45} - 304.339\left(1 - \frac{T}{516.2}\right)^{2} + 139.756\left(1 - \frac{T}{516.2}\right)^{3}\right]$$

±0.3, from 10 to 240°C. At 20°C, d_4^{20} = 0.7892; a^2 (air) = 0.0576_8.

$C_2H_6O_2$, Glycol (I, II) [52, 61]

t, °C	γ (air or vapor) ±1.5
0	49.0
20	47.7
50	45.3
80	42.3
130	36.7

$C_2H_6O_4S$, Dimethyl sulfate (III) [82]

t, °C	γ (air) ±1§§
18	40.12
36.5	37.76
55	35.46
74.5	33.25
93	31.03

C_2H_6S, Methyl sulfide (I) k_E = 2.1 [6]

t, °C	γ ± < 1.5
11.1	26.50
32.9	23.33
57.7	19.87

C_2H_6S, Ethylmercaptan (I, II) k_E = 2.1 [20, 39, 61]

t, °C	γ (air or vapor) ±0.7
0	25.4
10	24.0
20	22.5

C_2H_7N, Dimethylamine (III) [30]

t, °C	γ (N_2) ±2†
−78	25.2
−23	20.2
+ 5	17.7

For notes †–§§ *see* p. 475.

C_2H_7N, Ethylamine (III) [30]

t, °C	γ (N_2) ±2†
−74	29.1
−21.5	23.4
+ 9.9	20.4

$C_2H_8N_2O_3$, Dimethylammonium nitrate (I) k_E = 0.6 [88]

t, °C	γ (air) ±0.5
69.6	52.05
97.6	50.65
118.0	49.75

$C_2H_8N_2O_3$, Ethylammonium nitrate (I) k_E = 0.5 [88]

t, °C	γ (air) ±0.5
17.5	47.67
20.0	47.62
45.2	46.53
58.5	46.02

$C_3H_2N_2$, Malononitrile (I)

At 36°C, a^2 = 0.09_6; varies with time, temperature and thermal history of the sample, *v.* [89].

$C_3H_4Br_2O_2$, α, β-Dibromopropionic acid (I) [53]

t, °C	γ (?) ±3
50	87
90	56

$C_3H_4Cl_2O$, α, α-Dichloroacetone (II) [23]

At 20°C, γ (air) = 31.91 ± 0.2

C_3H_5Br, 3-Bromopropylene (I) [73]

a^2 = 0.042869 − 0.000148t, γ = 21.35 at 70.0°C

t, °C	a^2 ±2%
8.0	0.04170
37.5	0.03730
43.5	0.03640
55.0	0.03472

$C_3H_5Br_3$, 1, 2, 3-Tribromopropane (II) [25]

At 20°C, γ (air) = 45.36 ± 0.3

C_3H_5ClO, Chloroacetone (II) [23]

At 20°C, γ (air) = 35.27 ± 0.2

C_3H_5ClO, α-Epichlorohydrin (I, III) [73, 82.7]

t, °C	γ (air or vapor) ±0.3
10	38.5
20	37.0
50	32.9
85	28.2

$C_3H_5ClO_2$, Ethyl chloroformate (I) k_E = 2.1 [61]

t, °C	γ ±1.0
15.1	27.5
46.5	23.5

C_3H_5I, 3-Iodopropylene (I) [73]

a^2 = 0.03747 − 0.000110t, γ = 21.4 at 102.0°C

t, °C	a^2 ±2%
11.1	0.03625
43.5	0.03269
45.8	0.03249
66.5	0.03016

C_3H_5N, Propionitrile (I, II) k_E = 1.6 [47, 61, 62, 73]

t, °C	γ (air or vapor) ±0.3 ¶
10	28.3
20	27.2
50	23.8
75	21.0
90	19.4

C_3H_5NO, Lactonitrile (I) k_E = 1.3 [83]

t, °C	γ (?) ±0.5
20	36.7
30	35.8
45	34.3
60	32.9

C_3H_5NS, Ethyl thiocyanate (I) [61, 73]

t, °C	γ
20	36.2
80	28.8
140	21.3

C_3H_5NS, Ethyl isothiocyanate

t, °C	γ (air) (II) [39]	t, °C	γ (vapor) (I) [61]
30.0	31.69	18.4	36.25
40.0	30.56	46.0	32.59
50.0	29.49	k_E = 2.2	

$C_3H_6Br_2$, 1, 2-Dibromopropane (I) [73]

a^2 = 0.038869 − 0.0000950t, γ = 21.2 at 141.5°C

t, °C	a^2 ±2%
10.0	0.03792
63.5	0.03283
71.7	0.03205

$C_3H_6Cl_2$, 1, 2-Dichloropropane (I) [73]

t, °C	a^2 (air) ±2%	γ
8	0.05246	
98	0.03889	20.0

C_3H_6O, Allyl alcohol (I, II) k_E = 1.5 [50, 61, 72]

t, °C	γ (air or vapor) ±0.5
0	27.6
20	25.8
50	23.2
95	19.2

C_3H_6O, Acetone (I, II, III) k_E = 1.9 [12, 43, 47, 48, 61, 62, 72, 91, 94]

t, °C	γ (air or vapor) ±0.2
0	26.21
20	23.70
40	21.16
60	18.61
80	16.2±0.3

$C_3H_6O_2$, Propionic acid (I, II) k_E = 1.5 [50, 61, 73]

t, °C	γ (air) ±0.3	γ (vapor) ±0.6
10	27.7	27.7
20	26.7	26.7
50	23.7	23.7
80	20.8	20.8
140	15.7	15.7

$C_3H_6O_2$, Ethyl formate (I, II) k_E = 2.1 [43, 49, 58, 72]

t, °C	γ (air or vapor) ±0.3
0	26.2
20	23.6
50	19.8
80	16.0
130	10.0
185	4.0
210	1.9

$C_3H_6O_2$, Methyl acetate (I, II) k_E = 2.2 [49, 58, 65, 72]

t, °C	γ (air or vapor) ±0.3
0	27.4
20	24.6
50	20.6
80	16.6
130	10.3
180	4.5
215	1.2

C_3H_7Br, Propyl bromide (I) [73]

$a^2 = 0.04184 - 0.0001428t$, γ = 19.65 at 71.0°C

t, °C	a^2 ±2%
10.0	0.04041
45.2	0.03539
68.5	0.03206

C_3H_7Br, Isopropyl bromide (I) [73]

$a^2 = 0.04002 - 0.000145t$, γ = 19.05 at 60.5°C

t, °C	a^2 ±2%
10.5	0.03849
26.0	0.03625
38.3	0.03447
52.5	0.03241

C_3H_7Cl, n-Propyl chloride (I) [72]

t, °C	a^2 (air) ±1.5%	γ (air)
5.6	0.0533	
47	0.0436	18.3

$C_3H_7ClO_2$, Monochlorohydrin (I) k_E = 1.5 [89]

t, °C	γ (air) ±0.3
17.0	49.19
35.0	47.43
57.8	45.17
80.2	42.97
98.5	41.19

C_3H_7I, n-Propyl iodide (I) [73]

$a^2 = 0.03645 - 0.0001045t$, γ = 20.0 at 102.5°C

t, °C	a^2 ±2%
14.0	0.03499
40.0	0.03227
70.0	0.02914
85.3	0.02754

C_3H_7I, Isopropyl iodide (I) [73]

$a^2 = 0.034596 - 0.0001045t$, γ = 19.5 at 89.0°C

t°, C	a^2 ±2%
7.0	0.03386
49.5	0.02942
70.0	0.02727
77.0	0.02654

C_3H_7N, Allylamine (I) [73]

t, °C	a^2 (air) ±2%	γ (air)
11.0	0.06786	
56	0.05907	21.2

C_3H_7NO, Acetoxime (I) k_E = 1.7 [11]

t, °C	γ ±0.4
63.26	26.15
76.10	24.61
98.50	22.25
113.40	20.79
117.70	20.68

C_3H_7NO, n-Propionaldoxime (I) k_E = 1.4 [11]

t, °C	γ ±0.4
23.45	29.01
54.70	25.99
97.84	22.05

C_3H_7NO, Propionamide (I) k_E = 1.3 [83]

t, °C	γ (?) ±0.5
80	32.1
90	31.2
105	29.8
120	28.4

$C_3H_7NO_2$, Lactamide (I) k_E = 1.1 [83]

t, °C	γ (?) ±0.5
80	44.6
90	43.8
105	42.6
120	41.3

C_3H_8O, n-Propyl alcohol (I, II) k_E = 1.3 [47, 61, 62, 65, 72]

t, °C	γ (air)*
− 5.0	25.9 ±0.2
+20.0	23.8 ±0.2
40.0	22.15±0.2
60.0	20.5 ±0.2
80.0	18.85±0.3
95.0	17.6 ±0.3

C_3H_8O.—(*Continued*)

* γ (vapor) = same +0.6 to −0.3.

C_3H_8O, Isopropyl alcohol (I) k_E = 1.1 [61, 72]

t, °C	γ (air or vapor) ±0.3
5	22.8
20	21.7
50	19.3
80	17.0

C_3H_8O, Methyl ethyl ether (I) k_E = 2.2 [6]

t, °C	γ ± <1.5
7.9	17.54
33.5	14.10
45.5	12.60

$C_3H_8O_2$, Methylal (III) [91] At 18.0°C, γ (air) = 21.4 ± 0.3

$C_3H_8O_3$, Glycerol (I) [10, 15, 30, 90.5]

t, °C	γ (air) ±3.0
20	63.4
90	58.6
150	51.9

C_3H_9N, n-Propylamine (I) k_E = 1.9 [73, 83]

t, °C	γ (air) ±0.3
10	23.5
20	22.4
30	21.2
45	19.4

C_3H_9N, Isopropylamine (III) [30]

t, °C	γ (N_2) ±2†
−72	28.1
0	19.4
+25.2	16.8

C_3H_9N, Trimethylamine (III) [30]

t, °C	γ (N_2) ±2†
−73	24.8
−32	20.0
− 4	17.3

$C_4H_4Cl_2O_2$, Succinyl chloride (III) γ (air) [96]

$C_4H_4N_2$, Succinonitrile (I) k_E = 0.6 [87]

t, °C	γ (air) ±0.3
80.1	35.45
99.5	33.79
118.2	32.17

C_4H_4S, Thiophene (I) [74]

t, °C	γ (air) ±0.3
0	36.2
20	33.1
40	30.1
60	27.1
80	24.3

For notes †–§§ *see* p. 475.

$C_4H_5Cl_3O_2$, Ethyl trichloroacetate (I) [31, 73]

t, °C	γ (air) ±0.4
10	32.3
20	31.2
50	28.1
70	25.9
165	15.9

$C_4H_5NO_2$, Methyl cyanoacetate (III) [30]

t, °C	γ (N_2) ±2†
−16	43.9
+90	31.7
197	20.1

C_4H_5NS, Allyl isothiocyanate (I, II) k_E = 2.1 [39, 73]

t, °C	γ (air or vapor)
0	36.8±0.3
20	34.5±0.3
60	29.8±0.3
90	26.5±0.4
150	20.6±0.4

$C_4H_6Cl_2O_2$, Ethyl dichloroacetate (I) [73]

t, °C	a^2 (air) ±2%	γ (air)
7.3	0.05183	
158	0.03143	16.8

$C_4H_6O_3$, Acetic anhydride (I) k_E = 2.2 [61, 73]

t, °C	γ ±0.3
15	33.3
20	32.7
50	29.2
140	18.6

$C_4H_7ClO_2$, Ethyl chloroacetate (I) [73]

t, °C	a^2 (air) ±2%	γ (air)
7	0.05731	
144.5	0.03643	17.3

C_4H_7N, n-Butyronitrile (I, II) k_E = 1.7 [23, 39, 62, 83]

t, °C	γ (air) ±0.4¶
10	28.7
20	27.6
50	24.5
75	21.9
110	18.2

$C_4H_8Cl_2S$, β, β′-Dichloroethyl sulfide (II) [24] At 20°C, γ (air) = 42.82 ± 0.5

C_4H_8O, Methyl ethyl ketone (I, II) [13, 47]

t, °C	γ (air or vapor) ±0.2
0	26.9
20	24.6
40	22.3
75	18.4

$C_4H_8O_2$, *n*-Butyric acid (I, II) k_E = 1.6 (50, 61, 73)

t, °C	γ (air) ±0.3*
0	28.8
20	26.8
50	24.0
100	19.5
160	14.5

* γ (vapor) = same +0.3 ±0.5.

$C_4H_8O_2$, Isobutyric acid (I, II) k_E = 1.6 (50, 61, 73)

t °C	γ (air or vapor)
0	27.1±0.3
20	25.2±0.3
50	22.4±0.4
100	17.9±0.5
150	13.8±0.5

$C_4H_8O_2$, Ethyl acetate (I, II, III) k_E = 2.3 (17, 49, 60, 62, 65, 72, 91)

t, °C	γ (vapor)	γ (air) ±0.3
0	26.9 ±0.4	26.5
20	24.3 ±0.4	23.9
50	20.4 ±0.4	20.2
75	17.4 ±0.3	17.4
100	14.4 ±0.3	
150	8.7 ±0.3	
200	3.7 ±0.3	
240	0.5 ±0.3	
245	0.15±0.3	

$C_4H_8O_2$, Methyl propionate (I, II) k_E = 2.2 (43, 49, 58, 72)

t, °C	γ (air or vapor) ±0.3
10	26.1
20	24.9
40	22.45
80	17.6
130	11.8
180	6.4
237	1.2

$C_4H_8O_2$, *n*-Propyl formate (I, II) k_E = 2.2 (49, 58, 65, 72)

t, °C	γ (air or vapor) ±0.3
0	26.8
20	24.5
50	21.1
100	15.5
130	12.1
190	5.9
240	1.5

C_4H_9Br, Isobutyl bromide (I) (73)

a^2 = 0.04386 − 0.000141t, γ = 17.6 at 91.0°C

t, °C	a^2 ±2%
10.1	0.04244
58.0	0.03710
69.5	0.03407

C_4H_9Cl, Isobutyl chloride (I, II) (23, 73)

t, °C	γ (air)
10	23.1 ±0.2
20	21.94 ±0.1
70	16.2 ±0.2

C_4H_9Cl, *tert.*-Butyl chloride (II) (23)

At 20°C γ (air) = 19.59 ± 0.2

C_4H_9I, Isobutyl iodide (I) (73)

a^2 = 0.03786 − 0.0001032t, γ = 17.9 at 119.5°C

t, °C	a^2 ±2%
6.5	0.03719
48.5	0.03286
70.2	0.03062
74.5	0.03017

C_4H_9NO, Methyl ethyl ketoxime (I) (17)

t, °C	γ ±0.3
13.8	30.38
150.4	16.64

$C_4H_9NO_2$, *n*-Butyl nitrite (III) (82)

t, °C	γ ±1 (air)§§
13	22.25
28.5	20.48
42.5	19.12
56.5	17.58

$C_4H_9NO_2$, Methylurethane (I) (17)

t, °C	γ ±0.3
55.9	38.88
101.2	33.39
150.9	27.69

$C_4H_{10}N_2O$, Diethylnitrosoamine (I) k_E = 1.9 (83)

t, °C	γ (?) ±0.5
20	33.1
30	32 1
45	30.6
60	29.0
75	27.4

$C_4H_{10}O$, *n*-Butyl alcohol (I, II) (50, 61, 65)

t, °C	γ (air or vapor) ±0.4
0	26.2
20	24.6
50	22.1
100	17.8
130	15.1

$C_4H_{10}O$, Isobutyl alcohol (I, II) (20, 50, 61, 62, 64, 72)

At 20°C, a^2 (air) = 0.05821; d_4^{20} = 0.8019

t, °C	γ (air)	γ (vapor) ±0.3
0	24.4±0.2	
20	22.8±0.1	23.0
30	22.1±0.1	22.3
50	20.5±0.2	22.7

$C_4H_{10}O$.—(*Continued*)

t, °C	γ (air)	γ (vapor) ±0.3
75	18.5±0.3	18.6
105	15.9±0.3	15.9
130		13.7

$C_4H_{10}O$, *d-sec.*-Butyl alcohol (I) (76)

t, °C	γ‡‡	k_E
10	23.5	1.4
80	17.4	1.5

$C_4H_{10}O$, *dl-sec.*-Butyl alcohol (I) (76)

t, °C	γ‡‡	k_E
10	23.5	1.4
80	17.4	1.5

$C_4H_{10}O$, *tert.*-Butyl alcohol (I) (2, 65)

t, °C	γ (air or vapor) ±0.5
20	20.7
80	14.6

$C_4H_{10}O$, Ethyl ether (I, II) (20, 34, 51, 60, 63, 72)

t, °C	γ ±0.2
20	17.01
50	13.47
100	7.97
150	3.12
190	0.15

γ (vapor) = $57.358\left(1 - \frac{T}{466.9}\right)^{1.23}$ ±0.2, from 20 to 193°C. γ (air) ±0.2 = 16.96 at 20°C; k_E = 2.25 from 0 to 100°C. At 20°C, d_4^{20} = 0.7133; a^2 (air) = 0.04865; γ (vapor) − γ (air) = +0.05.

$C_4H_{10}O_2$, Dimethylacetal (I) (73)

a^2 = 0.05676 − 0.000217t, γ = 17.13 at 63.3°C

t, °C	a^2 ±2%
7.5	0.05514
29.5	0.05036
45.0	0.04700
60.0	0.04353

$C_4H_{10}O_3S$, *sym.*-Diethyl sulfite (I, II) k_E = 2.2 (44, 89)

t, °C	γ (air)
10	30.4
20	29.4
50	26.3
90	22.2

$C_4H_{10}O_3S$, Ethyl ethylsulfonate (I) k_E = 2.0 (89)

t, °C	γ (air) ±0.3
17.6	36.31
49.7	32.99
71.5	30.80
96.5	28.30

For notes †–§§ *see* p. 475.

$C_4H_{10}O_4S$, Diethyl sulfate (III) (82)

t, °C	γ (air) ±1§§
13	34.61
32.5	32.54
48	30.86
70	28.60

$C_4H_{10}S$, Ethyl sulfide (I) (73)

t, °C	γ ±0.4
10	26.5
50	21.9
90	17.3

$C_4H_{11}N$, *n*-Butylamine (III) (30)

t, °C	γ (N_2) ±2†
−21	26.1
+41	19.7
70.8	17.4

$C_4H_{11}N$, Isobutylamine (I) (73)

t, °C	a^2 (air) ±2%	γ (air)
12.3	0.06371	
68	0.05218	17.6

$C_4H_{11}N$, *tert.*-Butylamine (III) (30)

t, °C	γ (N_2) ±2†
−30	22.5
+10	18.4
40.5	15.3

$C_4H_{11}N$, Diethylamine (I) (73)

t, °C	a^2 (air) ±2%	γ (air)
10.2	0.06069	
56	0.04986	16.4

$C_4H_{12}N_2O_3$, Diethylammonium nitrate (I) k_E = 0.8 (88)

t, °C	γ (air) ±0.4
99.6	40.31
100.0	40.30
109.0	39.84
114.8	39.51

$C_5H_4O_2$, Furfural (I, II) (50, 73)

t, °C	γ (air or vapor) ±0.4
20	43.5
30	42.2
40	40.9
160	25.4

C_5H_5N, Pyridine (I, II) k_E = 2.3 (40, 49, 51, 61, 62, 73, 94)

t, °C	γ (air)*
0	40.8±1.0
20	38.0±1.0
40	35.0±0.8
60	32.1±0.7
80	29.3±0.6
100	26.4±0.5
115	24.2±0.5

* γ (vapor) = same +2.0 to −0.5.

C_5H_6, Cyclopentadiene (I) k_E = 1.5 (92)

t, °C	γ ±0.4
40.4	31.5
101.1	25.2
139.9	21.0

$C_5H_7NO_2$, Ethyl cyanoacetate (I) k_E = 1.9 (89)

t, °C	γ (air) ±0.3
17.5	36.07
31.3	34.53
61.0	31.33
83.9	29.07
101.3	27.32

$C_5H_8O_2$, Acetylacetone (I, II) (39, 69, 92)

t, °C	γ (air or vapor)
0	33.3±0.2
20	31.2±0.2
50	28.0±0.2
100	23.0±0.3
145	18.6±0.3

$C_5H_8O_2$, β, β-Dimethylacrylic acid (I) k_E = 1.8 (16)

t, °C	γ (air) ±*ca.* 1.5
85	27.9
110	25.7
137	23.0
155	21.6
177	19.4

$C_5H_8O_2$, Allyl acetate (I) (73)

t, °C	a^2 (air) ±2%	γ (air)
4.5	0.06118	
103	0.04106	16.5

$C_5H_8O_3$, Levulinic acid (III) (30)

t, °C	γ (N_2) ±2†
25.5	39.7
81.5	35.5
115	32.9

$C_5H_8O_4$, Dimethyl malonate (II) (39)

t, °C	γ (air) ±0.4
10	38.33
30	35.82
50	33.30

C_5H_9N, Isovaleronitrile (I, II) (23, 39, 73)

t, °C	γ (air)
10	27.0 ±0.2
20	26.03±0.1
50	23.3 ±0.2
130	16.0 ±0.5

C_5H_9NS, *n*-Butyl isothiocyanate (I) k_E = 2.2 (7)

t, °C	γ ±0.3
11.2	31.78
55.2	27.21
108.5	21.87

For notes †-§§ *see* p. 475.

C_5H_{10}, Trimethylethylene (I, II) (20, 72)

t, °C	γ (air)
7	18.9 ±0.3
20	17.26±0.1
37	15.1 ±0.3

$C_5H_{10}O$, Isovaleraldehyde (I) (73)

$a^2 = 0.06425 - 0.000195t$; γ = 16.3 at 93.0°C

t, °C	a^2 ±2%
10.0	0.06230
53.5	0.05382
68.0	0.05099
78.7	0.04890

$C_5H_{10}O$, Diethyl ketone (II) (47)

t, °C	γ (air) ±0.3
0	26.90
15	25.33
30.1	23.73
45	22.20

$C_5H_{10}O$, Methyl propyl ketone (I, II) k_E = 2.0 (50, 61, 62)

t, °C	γ (air) ±0.5	γ (vapor) ±0.8
0	27.3	
20	25.2	26.1
50	21.9	22.6
90	17.7	

$C_5H_{10}O_2$, Ethyl propionate (I, II) k_E = 2.3 (43, 49, 58, 72)

t, °C	γ (air or vapor) ±0.3
5	25.9
20	24.2
50	20.9
100	15.5
130	12.4
180	7.3
238	2.2

$C_5H_{10}O_2$, Isovaleric acid (I, II) k_E = 1.7 (20, 50, 61, 65, 73)

t, °C	γ (air)	γ (vapor) ±1
15	26.16±0.1	26.16
20	25.33±0.1	25.33
40	23.67±0.1	23.67
80	20.4 ±0.3	20.4
175	12.6 ±0.5	12.6

$C_5H_{10}O_2$, Isobutyl formate (I) (72)

t, °C	a^2 (air) ±1.5%	γ (air)
5.2	0.05871	
98.5	0.04149	15.8

$C_5H_{10}O_2$, Methyl *n*-butyrate (I, II) k_E = 2.3 (43, 49, 58, 72)

t, °C	γ (air or vapor)
10	26.15±0.2
20	25.00±0.2
40	22.73±0.2
60	20.43±0.2

$C_5H_{10}O_2$.—(*Continued*)

t, °C	γ (air or vapor)
100	16.1±0.2
132.5	12.5±0.5
185.0	7.3±0.5
210.0	5.0±0.5
238.0	2.7±0.5

$C_5H_{10}O_2$, Methyl isobutyrate (I, II) k_E = 2.3 (49, 58, 62, 65, 72)

t, °C	γ (vapor) ±0.3	γ (air) ±0.2
10	24.9	24.92
20	23.8	23.79
50	20.4	20.40
75	17.6	17.60
100	14.9	
125	12.2	
150	9.6	
175	7.2	
200	4.8	
237	1.8	

$C_5H_{10}O_2$, *n*-Propyl acetate (I, II) k_E = 2.3 (43, 49, 58, 72)

t, °C	γ (air or vapor) ±0.3
0	26.6
20	24.3
50	21.0
100	15.6
130	12.4
190	6.5
240	2.2

$C_5H_{10}O_3$, Diethyl carbonate (II, III) (20, 82)

t, °C	γ (air)
13	27.2 ±0.2
20	26.31±0.1
40	24.0 ±0.2
65	21.1 ±0.2

$C_5H_{10}O_3$, *dl*-Ethyl lactate (I, II) k_E = 2.1 (29, 43, 44)

t, °C	γ (air or vapor) ±0.3
0	31.9
20	29.9
50	26.8
80	23.7
110	20.7

$C_5H_{10}O_4$, Glyceryl acetate (I) k_E = 1.7 (89)

t, °C	γ (air)
17.0	43.5
37.5	41.6
70.0	38.6
(II) (39)	
10.0	41.3
37.5	38.6

$C_5H_{11}Br$, Isoamyl bromide (I) (73)

$a^2 = 0.04650 - 0.000134t$, γ = 16.3 at 118.5°C

$C_5H_{11}Br$.—(*Continued*)

t, °C	a^2 ±2%
15.1	0.0445
47.0	0.0402
69.5	0.0372
87.5	0.0348

$C_5H_{11}Cl$, Isoamyl chloride (I, II) (23, 73)

t, °C	γ (air)
10	24.4 ±0.3
20	23.48±0.1
100	15.7 ±0.3

$C_5H_{11}I$, Isoamyl iodide (I) (14, 73)

t, °C	a^2 ±2%
5	0.0400
20	0.0384
40	0.0363
70	0.0332
145	0.0253

$C_5H_{11}N$, Piperidine (I, II) k_E = 2.1 (47, 58, 61, 73)

t, °C	γ (air) ±0.2*
0	32.65
20	30.20
30	28.95
50	26.6
75	23.7
105	20.4
130	17.5

* γ (vapor) = same +0.2 ±0.3.

$C_5H_{11}NO$, Methyl propyl ketoxime (I) k_E = 1.9 (11, 62)

t, °C	γ (air) ±0.3
10	30.0
20	29.1
50	26.3
100	21.7
145	17.6

$C_5H_{11}NO$, Isovaleraldoxime (I) k_E = 1.7 (11, 17)

t, °C	γ ±0.3
20	27.8
50	25.0
100	20.6
150	16.4

$C_5H_{11}NO_2$, Isoamyl nitrite (III) (82)

t, °C	γ (air) ±1§§
14	22.04
35	20.35
56	18.06
73	16.28

$C_5H_{11}NO_2$, Ethylurethane (I) k_E = 1.5 (17, 83)

t, °C	γ ±0.3
60	31.8
80	29.9
100	27.9
150	22.9

$C_5H_{11}NO_3$, Isoamyl nitrate (I, II) (23, 73)

t, °C	γ (air)
20	27.18±0.1
143	20.0 ±0.4

C_5H_{12}, Isopentane (II) (23)
At 20°C, γ (air) = 13.72 ±0.2

$C_5H_{12}O$, Isoamyl alcohol (I, II, III) (42, 46, 62, 65, 72, 91)

t, °C	γ (air) ±0.5
0	25.3
10	24.6
20	23.8
50	21.5
100	17.7
130	15.1

$C_5H_{12}O$, *tert.*-Amyl alcohol (I) (72)

t, °C	a^2 (air) ±1.5%	γ (air)
3.9	0.05949	
120	0.04283	15.2

$C_5H_{12}O$, Ethyl propyl ether (II) (50)

t, °C	γ (air) ±0.3
0	21.69
20	19.46

$C_5H_{13}N$, *n*-Amylamine (III) (30)

t, °C	γ (N_2) ±2†
−21	25.9
+41.2	20.4
99.8	15.6

$C_5H_{13}N$, Isoamylamine (I)
k_E = 2.0 (73, 83)

t, °C	γ (air) ±0.4
10	24.6
20	23.6
50	20.75
75	18.35
95	16.4

$C_5H_{13}N$, *tert.*-Amylamine (III) (30)

t, °C	γ (N_2) ±2†
−70	27.6
+29.3	19.7
70	15.5

$C_6H_3BrN_2O_4$, 4-Bromo-1, 2-dinitrobenzene (I) (53)

t, °C	γ (?) ±3
40	13
80	12

$C_6H_3ClN_2O_4$, 1-Chloro-2, 4-dinitrobenzene (III) (30)

t, °C	γ (N_2) ±2†
60.4	45.5
136	38.3
204.2	31.5

$C_6H_3ClN_2O_4$, 4-Chloro-1, 2-dinitrobenzene (I) (53)

t, °C	γ (?) ±3
30	14
70	12

$C_6H_3Cl_2NO_2$, 1, 2-Dichloro-4-nitrobenzene (III) (30)

t, °C	γ (N_2) ±2†
46	40.2
136	32.0
204	25.6

$C_6H_3Cl_2NO_2$, 1, 3-Dichloro-4-nitrobenzene (III) (30)

t, °C	γ (N_2) ±2†
35	41.3
114.9	33.3
204	24.4

$C_6H_3Cl_2NO_2$, 1, 4-Dichloro-2-nitrobenzene (III) (30)

t, °C	γ (N_2) ±2†
60.5	38.3
136	31.5
204	25.0

$C_6H_3Cl_3O$, 2, 4, 6-Trichlorophenol (III) (30)

t, °C	γ (N_2) ±2†
70.2	36.3
156	28.6
196.5	24.1

C_6H_4BrCl, *p*-Chlorobromobenzene (III) (81)

t, °C	γ (air) ±1§§
70	33.15
102	29.81
106	29.41
132	26.75
164	23.54
194	20.60

$$\gamma\ (\text{air}) = 71.83\left(1 - \frac{T}{722}\right)^{1.2}$$

C_6H_4BrF, *p*-Fluorobromobenzene (III) (30)

t, °C	γ (N_2) ±*ca.* 2†
−21	39.8
+70	29.4
138	22.4

$C_6H_4BrNO_2$, *o*-Bromonitrobenzene (III) (82.6)

t, °C	γ (air) ±1§§
55.5	43.44
67.5	42.12
80	40.56
94.5	38.94

$C_6H_4BrNO_2$, *m*-Bromonitrobenzene (III) (82.6)

t, °C	γ (air) ±1§§
63	42.45
71.5	41.36
83	40.10
91	38.94

$C_6H_4BrNO_2$, *p*-Bromonitrobenzene (III) (82.6)

t, °C	γ (air) ±1§§
132	34.58
145	33.12
159.5	31.78
170	30.63

C_6H_4ClI, *p*-Chloroiodobenzene (III) (81)

t, °C	γ (air) ±1§§
61	37.57
88	34.78
113	32.22
127	30.80

For notes †–§§ *see* p. 475.

C_6H_4ClI.—(*Continued*)

t, °C	γ (air) ±1§§
167	26.82

$$\gamma\ (\text{air}) = 74.71\left(1 - \frac{T}{767}\right)^{1.2}$$

$C_6H_4ClNO_2$, *o*-Chloronitrobenzene (III) (82.6)

t, °C	γ (air) ±1§§
50.5	42.29
70.5	39.80
91.5	37.23
121	34.04

$C_6H_4ClNO_2$, *m*-Chloronitrobenzene (III) (82.6)

t, °C	γ (air) ±1§§
60.5	41.79
74.5	38.76
90.5	36.27
129	31.77

$C_6H_4ClNO_2$, *p*-Chloronitrobenzene (III) (81)

t, °C	γ (air) ±1§§
97	35.73
111	34.23
127	32.52
141	31.05
156	29.48
179	27.19
186	26.38

$$\gamma\ (\text{air}) = 78.68\left(1 - \frac{T}{768}\right)^{1.2}$$

$C_6H_4Cl_2$, *m*-Dichlorobenzene (III) (30)

t, °C	γ (N_2) ±2†
−22	41.6
+90.7	28.6
160	22.8

$C_6H_4Cl_2$, *p*-Dichlorobenzene (III) (81)

t, °C	γ (air) ±1§§
68	30.72
96	27.65
117	25.39
139	23.06
150	21.84
166	20.24
170	19.84

$$\gamma\ (\text{air}) = 71.45\left(1 - \frac{T}{675}\right)^{1.2}$$

$C_6H_4FNO_2$, *m*-Fluoronitrobenzene (III) (30)

t, °C	γ (N_2) ±2†
0	40.1
104.5	29.7
196	21.4

$C_6H_4FNO_2$, *p*-Fluoronitrobenzene (III) (30)

t, °C	γ (N_2) ±2†
24.5	38.4
89.3	31.3
194.1	20.3

$C_6H_4INO_2$, *o*-Iodonitrobenzene (III) (30)

t, °C	γ (N_2) ±2†
61	43.1
136	35.8
205	29.5

$C_6H_4INO_2$, *m*-Iodonitrobenzene (III) (30)

t, °C	γ (N_2) ±2†
25.7	47.3
156.1	33.7
216	28.6

$C_6H_4N_2O_4$, *o*-Dinitrobenzene (III) (30)

t, °C	γ (N_2) ±2†
126	38.4
176	33.6
209.1	30.9

$C_6H_4N_2O_4$, *m*-Dinitrobenzene (III) (30)

t, °C	γ (N_2) ±2†
94.8	42.3
155	36.1
204.5	31.8

$C_6H_4N_2O_4$, *p*-Dinitrobenzene (III) (30)

t, °C	γ (N_2) ±2†
176.2	34.4
210	31.5
226	30.4

$C_6H_4N_2O_5$, 2, 4-Dinitrophenol (III) (30)

t, °C	γ (N_2) ±2†
125.4	41.1
170	37.3
215	32.9

$C_6H_4O_2$, *p*-Benzoquinone (III)
γ (air) (96)

C_6H_5Br, Bromobenzene (I, II, III) (25, 40, 73, 81)

t, °C	γ (air) ±0.5
10	37.7
20	36.5
50	33.0
100	27.2
150	21.7

C_6H_5BrO, *m*-Bromophenol (I)
k_E = 1.8 (28)

t, °C	γ ±0.4
44.5	42.87
69.5	40.51
100.1	37.40

C_6H_5BrO, *p*-Bromophenol (I)
k_E = 1.9 (28)

t, °C	γ ±0.4
74.4	42.36
99.9	39.54

C_6H_5Cl, Chlorobenzene (I, II, III) (23, 43, 51, 58, 59, 60, 62, 73, 80, 89)

t, °C	γ (air)	γ (vapor) ±0.2
10	34.40±0.2	34.78
20	33.19±0.1	33.56
30	31.98±0.2	32.35
40	30.79±0.2	31.15
50	29.63±0.2	29.95
75	26.77±0.2	27.00
100	24.00±0.2	24.11

C_6H_5Cl.—(*Continued*)

t, °C	γ (air)	γ (vapor) ± 0.2
130	20.71±0.2	20.72
150		18.52
200		13.24
250		8.33
300		3.92
330		1.64

γ (vapor) $= 72.20\left(1 - \frac{T}{632.3}\right)^{1.23} \pm 0.2$, from 10 to 333°C. $k_E = 2.21$ from 10 to 100°C; $=2.2$ from 10 to 250°C.

C_6H_5ClO, *o*-Chlorophenol (I) $k_E = 2.2$ (28)

t, °C	$\gamma \pm 0.4$
12.7	42.25
45.2	38.17
73.3	34.20

C_6H_5ClO, *m*-Chlorophenol (I) $k_E = 1.9$ (28)

t, °C	$\gamma \pm 0.4$
33.0	41.72
78.6	37.23
138.5	30.73

C_6H_5ClO, *p*-Chlorophenol (I) $k_E = 2.0$ (28)

t, °C	$\gamma \pm 0.4$
51.6	41.09
72.4	39.08
99.8	35.70

C_6H_5F, Fluorobenzene (II) (40)

t, °C	γ (air) ± 0.3
9.3	28.49
34.5	25.15

C_6H_5I, Iodobenzene (I, II, III) (18, 25, 40, 73, 81)

t, °C	γ (air)
15	40.3±0.3
20	39.7±0.2
60	35.2±0.3
100	30.6±0.5
150	25.0±0.7
189	10.8±1.0

$C_6H_5NO_2$, Nitrobenzene (I, II, III, IX) $k_E = 2.2$ (17, 23, 47, 61, 73, 75, 81)

t, °C	γ (air or vapor) ± 0.5
0	46.4
20	43.9
50	40.2
75	37.3
100	34.4
150	29.0
195	24.1

$C_6H_5NO_3$, *o*-Nitrophenol (I) $k_E = 2.5$ (28)

t, °C	$\gamma \pm 0.4$
53.2	37.73
79.7	34.50

$C_6H_5NO_3$, *m*-Nitrophenol (I) $k_E = 1.7$ (28)

t, °C	γ*
116.0	48.01
147.0	44.92

* The results of (30) are about 8 dyne/cm smaller.

$C_6H_5NO_3$, *p*-Nitrophenol (I) $k_E = 1.9$ (28)

t, °C	γ*
129.7	45.66
162.5	42.17

* The results of (30) are about 4.5 dyne/cm smaller.

$C_6H_5NO_4$, 2-Nitroresorcinol (III) (30)

t, °C	γ (N_2) ±2†
90.7	39.5
140	34.0
185.5	29.1

C_6H_6, Benzene (I, II, III, IX) (19, 21, 58, 59, 60, 61, 62, 63, 64, 66, 75, 77, 78, 80, 87, 89, 94); *v. also* p. 446

t, °C	γ (air)	γ (vapor)
0.0	31.58±0.2	31.70±0.15
10.0	30.22±0.05	
20.0	28.88±0.03	29.02±0.03
30.0	27.56±0.05	27.70
40.0	26.26±0.05	
50.0	24.98±0.1	25.08±0.10
60.0	23.72±0.1	
70.0	22.48±0.1	22.52±0.15
80.0	21.26±0.15	
100.0		18.78±0.2
150.0		12.86±0.2
200.0		7.41±0.2
250.0		2.66±0.2
270.0		1.08±0.15
280.0		0.42±0.1
285.0		0.14
288.5		0.00

γ (air) $= 31.58 - 0.137t + 0.0001t^2 \pm 0.2$, from 0°C to boiling point; γ (vapor) $= 71.926\left(1 - \frac{T}{561.6}\right)^{1.23} \pm 0.2$, from 0°C to T_C. $k_E = 2.22$, 0 to 100°C $= 2.2$, 0 to 220°C. At 20°C, $d_4^{20} = 0.8788$; a^2 (air) $= 0.06713$, γ (vapor) $- \gamma$ (air) $= 0.14$.

C_6H_6ClN, *o*-Chloroaniline (III) (30)

t, °C	γ (N_2) ±2†
−19	45.7
+80.9	35.1
196.5	26.1

C_6H_6ClN, *p*-Chloroaniline (III) (81)

t, °C	γ (air) ±1§§
81	39.72
117	35.79
133	34.06
153	31.93
185	28.57

$$\gamma \text{ (air)} = 81.37\left(1 - \frac{T}{787}\right)^{1.2}$$

$C_6H_6N_2O_2$, *m*-Nitroaniline (III) (30)

t, °C	γ (N_2) ±2†
124.2	42.7
170	38.5
201.3	35.6

$C_6H_6N_2O_2$, *p*-Nitroaniline (III) (30)

t, °C	γ (N_2) ±2†
151	46.7
171.5	44.8
184.5	43.6

C_6H_6O, Phenol (I, II) $k_E = 1.85$ (1, 7, 28, 41, 42, 48, 93)

t, °C	γ (air or vapor)
0	43.1 ±0.4
20	40.9 ±0.3
30	39.88±0.2
50	37.70±0.2
80	34.42±0.2
100	32.24±0.2
150	26.8 ±0.3
180	23.6 ±0.4

C_6H_6S, Thiophenol (I, II) $k_E = 2.0$ (39, 89)

t, °C	γ (air) ±0.5
10	41.0
20	39.8
45	36.7
75	33.1
90	31.3

$C_6H_7ClO_4$, Dimethyl chloromaleate (I) $k_E = 2.7$ (89)

t, °C	γ (air) ±0.3
20.3	37.56
52.6	33.58
75.5	30.84
100.3	27.99

$C_6H_7ClO_4$, Dimethyl chlorofumarate (I, II) $k_E = 2.7$ (44, 89)

t, °C	γ (air)
20	39.0±0.4
50	35.4±0.4
100	29.3±0.3

C_6H_7N, Aniline (I, II, III) $k_E = 2.1$ (23, 40, 51, 62, 73, 81)

t, °C	γ (air) ±0.4¶
10	44.0
20	42.9
50	39.4
100	33.7
150	27.9
180	24.4

C_6H_7N, α-Picoline (III) (30)

t, °C	γ (N_2) ±2†
−70	47.4
+46	31.3
126	22.5

C_6H_8ClN, Aniline hydrochloride (I) $k_E = 1.7$ (56)

t, °C	γ ±*ca.* 1
211.8	39.3
232.5	37.6

For notes †-§§ *see* p. 475.

$C_6H_8N_2$, Phenylhydrazine (I) (83)

t, °C	γ (?)
20	46.1
30	44.8
50	42.1
60	40.8

(II) (39)

t, °C	γ (air)
30	43.5
50	42.2

$C_6H_8O_4$, Dimethyl fumarate (III) (82.4)

t, °C	γ (air) ±1§§
106	25.67
123	23.77
132	22.75
146	21.20
163	19.18

$C_6H_8O_4$, Dimethyl maleate (III) (82.4)

t, °C	γ (air) ±1§§
24	37.31
51	34.12
113	26.85
143	23.42

$C_6H_8O_6$, Triformin (III) (30)

t, °C	γ (N_2) ±2†
0	49.6
91.2	39.6
184.8	28.8

$C_6H_9NO_2$, Propyl cyanoacetate (III) (30)

t, °C	γ (N_2) ±2†
−16	37.5
+71	29.1
201	17.5

C_6H_{10}, 1, 5-Hexadiene (I) (72)

t, °C	a^2 (air) ±1.5%	γ (air)
4.1	0.05935	
58.4	0.04627	14.7

$C_6H_{10}O$, Mesityl oxide (I) (14, 16)

t, °C	γ (air)
24	28.3±0.5
75	22.8±0.8
125	17.4±1.0

$C_6H_{10}O_2$, Methylacetylacetone (I) $k_E = 2.2$ (92)

t, °C	γ ±0.4
36.3	31.3
75.7	27.2
120.7	22.6

$C_6H_{10}O_3$, Ethyl acetoacetate (I, II) (39, 61, 69, 73)

t, °C	γ (air or vapor)
0	34.8 ±0.4
20	32.51±0.3
50	29.23±0.3
75	26.5 ±0.4
90	25.0 ±0.4
110	22.9 ±0.5
150	18.9 ±0.6

$C_6H_{10}O_3$, Methyl α-aceto-propionate (I) (92)

t, °C	γ ±0.4
36.0	30.9
97.1	24.1
151.4	18.6

$C_6H_{10}O_3$, Methyl methylaceto-acetate (III) (30)

t, °C	γ (N_2) ±2†
−71	46.5
+70.2	28.1
156	20.4

$C_6H_{10}O_4$, Dimethyl succinate (III) (30)

t, °C	γ (N_2) ±2†
25.2	34.1
95	26.4
176.2	17.5

$C_6H_{10}O_4$, Diethyl oxalate (I, II) (39, 73)

t, °C	γ (air or vapor) ±0.3
10	33.2
20	32.0
50	28.7
70	26.6

$C_6H_{10}O_6$, Dimethyl *d*-tartrate (I) k_E = 2.0 (37)

t, °C	γ‡‡
62.0	39.0
135.1	32.2

$C_6H_{10}O_6$, Dimethyl *dl*-tartrate (I) k_E = 2.0 (37)

t, °C	γ‡‡
89.6	35.2
159.2	28.8

$C_6H_{11}N$, Isoamyl cyanide (I) k_E = 1.9 (73, 83)

t, °C	γ
20	26.8±0.3
60	23.2±0.3
154	15.6±0.4

$C_6H_{11}NO$, Mesityl oxide oxime (I) k_E = 2.1 (11)

t, °C	γ ±0.4
22.10	32.27
54.60	28.69
74.95	26.63
105.00	24.66

$C_6H_{11}NO_2$, Ethyl β-aminocrotonate (I) (53)

t, °C	γ (?) ±3
10	33
60	27

C_6H_{12}, Cyclohexane, (II, III) (18, 30)

t, °C	γ (air)
10	26.9±1.0
20	25.3±0.3
80	15.7±1.5

$C_6H_{12}O$, Cyclohexanol (II) (18)
At 16.2°C, γ (air) = 34.23 ± 0.3

$C_6H_{12}O$, Ethyl propyl ketone (II) (23)
At 20°C, γ (air) = 25.39 ± 0.2

$C_6H_{12}O$, Methyl *n*-butyl ketone (II) (23)
At 20°C, γ (air) = 25.49 ± 0.2

$C_6H_{12}O$, Pinacolin (I) (73)
a^2 = 0.06440 − 0.000206*t*; γ = 15.1 at 105.5°C

t, °C	a^2 ±2%
8.6	0.06263
43.4	0.05546
60.2	0.05200
79.0	0.04813

$C_6H_{12}O_2$, Isocaproic acid (I) k_E = 1.7 (61)

t, °C	γ ±1.0
17.0	26.9
46.5	24.5
78.2	21.9
132.3	17.8

$C_6H_{12}O_2$, *act.*-Amyl formate (I, II) k_E = 2.2 (29, 44)

t, °C	γ (air or vapor) ±0.4‡
0	26.5
20	24.6
60	20.8
110	16.1

$C_6H_{12}O_2$, Isoamyl formate (I) (65, 72)

t, °C	γ (air or vapor) ±0.5
5	26.1
20	24.7
123	15.0

$C_6H_{12}O_2$, Isobutyl acetate (I, II) (40, 65, 72)

t, °C	γ (air) ±0.2
5	24.7
20	23.3
60	19.5
110	14.9

$C_6H_{12}O_2$, Ethyl *n*-butyrate (I, II) (51, 64, 72)
At 20°C, a^2 (air) = 0.05702; d_4^{20} = 0.8789

t, °C	γ (air)
5.0	26.1 ±0.3
20.0	24.54±0.2
60.0	20.6 ±0.3
119.0	14.7 ±0.5

$C_6H_{12}O_2$, Ethyl isobutyrate (I) (65, 72)

t, °C	γ (air or vapor)
5	24.83±0.3
20	23.25±0.2
110	13.85±0.3

$C_6H_{12}O_2$, Methyl isovalerate (I) (65, 72)

t, °C	γ (air or vapor)
20	24.1±0.2
115	14.6±0.4

$C_6H_{12}O_2$, *n*-Propyl propionate (I) (72)

t, °C	a^2 (air) ±1.5%	γ (air)
4.5	0.06040	
121.7	0.03804	14.3

$C_6H_{12}O_3$, Paraldehyde (I, II) k_E = 2.6 (50, 72)

t, °C	γ (air) ±0.5
5	27.5
20	25.9
50	22.6
124	14.5

$C_6H_{13}NO_2$, Isopropylurethane (I) (17)

t, °C	γ ±0.3
65.5	28.69
107.3	25.07
152.4	21.32

C_6H_{14}, *n*-Hexane (I, II) (13, 21, 23, 39, 72)

t, °C	γ (air)
0	20.52±0.2
20	18.43±0.2
40	16.3 ±0.2
68	13.4 ±0.3

$C_6H_{14}O$, Methyl isoamyl ether (I) (73)
a^2 = 0.060369 − 0.0002145*t*
At 91.0°C, γ = 13.82

t, °C	a^2 ±2%
6.5	0.05897
45.3	0.05065
72.6	0.04479
78.3	0.04357

$C_6H_{14}O_2$, Acetal (I, II) (50, 72)

t, °C	γ (air) ±0.2
5	23.2
20	21.65
40	19.6
100	13.5

$C_6H_{15}N$, Di-*n*-propylamine (I, II) k_E = 2.3 (23, 83)

t, °C	γ (air)
20	22.54±0.1
30	21.5 ±0.2
60	18.4 ±0.3

$C_6H_{15}N$, *n*-Hexylamine (III)

t, °C (30)	γ (N_2) ±2†
−18	28.0
+65	21.7
124.5	16.5

$C_6H_{15}N$, Isohexylamine (III)

t, °C (30)	γ (N_2) ±2†
−75	30.8
+60	20.3
121	15.9

$C_6H_{15}N$, Triethylamine (I, II) (41, 42, 73)

t, °C	γ (air) ±0.3
0	22.9
20	20.9
40	18.8
90	13.7

$C_6H_{15}O_4P$, Triethyl phosphate (III) (82)

t, °C	γ (air) ±1§§
15.5	30.61
38.5	28.30
69.5	25.44
87.5	23.65

C_7H_5BrO, Benzoyl bromide (I)

t, °C (14)	a^2 (air) ±2%
120	0.0439
169	0.0380

C_7H_5ClO, Benzoyl chloride (I) (73)
At 194.5°C, γ = 20.25
a^2 = 0.06891 − 0.000150*t*

t, °C	a^2 ±2%
9.8	0.06744
69.5	0.05849
81.5	0.05669
110.5	0.05234

C_7H_5N, Benzonitrile (I, II) k_E = 2.1 (17, 51, 62, 73, 83)

t, °C	γ (air or vapor) ±0.3
10	40.2
20	39.05
50	35.6
75	32.7
100	29.9
150	24.5
190	20.6

C_7H_5NS, Phenyl isothiocyanate (I, II) k_E = 2.4 (7, 25, 39, 73)

t, °C	γ (air or vapor) ±0.3
13	42.47
20	41.64
50	38.15
100	32.4
150	27.0
200	21.9
220	20.0

$C_7H_6Cl_2$, Benzal chloride (I) (73)
At 203.5°C, γ = 20.2
a^2 = 0.06432 − 0.000122*t*

t, °C	a^2 ±2%
11.5	0.06292
48.5	0.05840
76.5	0.05499
93.0	0.05297

C_7H_6O, Benzaldehyde (II) (23, 47)

t, °C	γ (air)
20	40.04±0.2
35	38.3 ±0.3
50	36.5 ±0.3

$C_7H_6O_2$, Salicyl aldehyde (III)

t, °C (30)	γ (N_2) ±2†
0	44.8
90.5	35.0
190	24.9

$C_7H_6O_2$, Toluquinone (III) γ (air) (96)

For notes †–§§ *see* p. 475.

C_7H_7Br, Benzyl bromide (I) (14)

t, °C	a^2 (air) ±2%
110	0.0472
156	0.0400

C_7H_7Br, o-Bromotoluene (I, II) (25, 73)

t, °C	γ (air)
20	34.85±0.2
180	18.6 ±0.5

C_7H_7Br, *p*-Bromotoluene (III) (81)

t, °C	γ (air) ±1.0§§
43	32.06
60	30.34
81	28.23
100	26.34
122	24.19
131	23.32
164	20.18

$$\gamma \text{ (air)} = 66.46\left(1 - \frac{T}{694}\right)^{1.2}$$

C_7H_7Cl, Benzyl chloride (I) (73)

$a^2 = 0.07287 - 0.0001719t$,

$\gamma = 19.5$ at 178.5°C

t, °C	a^2 ±2%
10.0	0.07115
50.0	0.06428
75.0	0.05998

C_7H_7Cl, *p*-Chlorotoluene (I, III) (73, 81)

t, °C	γ (air or vapor) ±1§§
25	32.08
50	29.38
64	27.90
79	26.31
108	23.30
120	22.08
151	18.95

$$\gamma \text{ (air or vapor)} = 66.65\left(1 - \frac{T}{653}\right)^{1.2}$$

C_7H_7F, *m*-Fluorotoluene (III) (30)

t, °C	γ (N_2) ±2†
−71	42.1
+25.4	28.3
84.9	22.4

C_7H_7I, *p*-Iodotoluene (III) (81)

t, °C	γ (air) ±1§§
39	35.66
59	33.64
78	31.73
100	29.56
122	27.35
140	25.68
166	23.20

$$\gamma \text{ (air)} = 69.28\left(1 - \frac{T}{734}\right)^{1.2}$$

C_7H_7NO, Benzamide (I)

$k_E = 1.3$ (83)

t, °C	γ (?) ±0.5
130	38.4
140	37.8
150	37.1
160	36.4
170	35.6

C_7H_7NO, Formanilide (I)

$k_E = 1.6$ (83)

t, °C	γ (?) ±0.5
60	39.4
75	38.1
90	36.8
105	35.4

$C_7H_7NO_2$, *o*-Nitrotoluene (I, II, III) (14, 23, 82.6)

t, °C	γ (air)
20	41.46±0.2
60	37.0 ±0.5
100	32.7 ±1
150	27.5 ±1.5
195	22.9 ±2

$C_7H_7NO_2$, *m*-Nitrotoluene (II, III) (23, 82.6)

t, °C	γ (air)
20	40.9±0.2
40	38.7±0.5
90	33.2±0.5
115	30.4±0.5

$C_7H_7NO_2$, *p*-Nitrotoluene (III) (81)

t, °C	γ (air) ±1§§
56	37.23
77	35.02
95	33.15
122	30.39
138	28.78
155	27.07
179	24.70
220	20.68

$$\gamma \text{ (air)} = 74.06\left(1 - \frac{T}{754}\right)^{1.2}$$

$C_7H_7NO_2$, Salicylamide (I)

$k_E = 1.4$ (83)

t, °C	γ (?) ±0.5
140	40.8
150	40.0
160	39.3
170	38.4

$C_7H_7NO_3$, *o*-Nitroanisole (III) (30)

t, °C	γ (N_2) ±2†
25.4	48.4
117	38.4
212	26.5

$C_7H_7NO_3$, *p*-Nitroanisole (III) (30)

t, °C	γ (N_2) ±2†
60.5	40.9
144.5	33.1
220	24.5

For notes †–§§ *see* p. 475.

C_7H_8, Toluene (I, II, III, IX)

$k_E = 2.2$ (20, 40, 43, 58, 62, 63, 72, 75, 89, 91)

t, °C	γ (air)	γ (vapor) ±0.3
0	30.74±0.2	
10	29.60±0.1	27.7
20	28.43±0.05	28.5
30	27.30±0.1	27.4
40	26.13±0.1	26.2
50	24.99±0.2	25.0
60	23.81±0.2	23.8
80	21.53±0.2	21.5
100	19.39±0.2	19.4
130		16.3

At 20°C, a^2 (air) = 0.06707; $d_4^{20} = 0.8658$

$C_7H_8N_2O$, Phenylmethylnitrosoamine (I) $k_E = 2.5$ (83)

t, °C	γ (?) ±0.5
20	45.4
30	44.2
45	42.4
60	40.5
75	38.7
90	36.9

$C_7H_8N_2O_2$, 2-Methyl-4-nitroaniline (III) (30)

t, °C	γ (N_2) ±2†
142	43.0
184.5	36.3

$C_7H_8N_2O_2$, 4-Methyl-2-nitroaniline (III) (30)

t, °C	γ (N_2) ±2†
121	36.4
151	33.1
185	29.8

$C_7H_8N_2O_2$, 2-Methyl-6-nitroaniline (III) (30)

t, °C	γ (N_2) ±2†
105	39.2
151	35.2
201.2	30.7

$C_7H_8N_2O_2$, *p*-Nitromethylaniline (III) (30)

t, °C	γ (N_2) ±2†
155.2	46.3
186	43.7
210	40.1

C_7H_8O, Benzyl alcohol (I, II)

$k_E = 1.6$ (18, 28, 65)

t, °C	γ (air or vapor) ±1
20	39.0
80	33.5

C_7H_8O, *o*-Cresol (I) $k_E = 2.0$ (7, 28, 62)

t, °C	γ (air or vapor) ±0.3
10	39.8
40	36.7
70	33.5
100	30.4
150	25.1
180	22.0

C_7H_8O, *m*-Cresol (I) $k_E = 1.8$ (28, 62, 65)

t, °C	γ (air or vapor) ±0.3¶
10	38.4
20	37.4
50	34.6
100	29.8
150	25.1
180	22.2

C_7H_8O, *p*-Cresol (I) $k_E = 1.7$ (28, 65)

t, °C	γ ±0.4
20	36.7
50	34.0
100	29.3

C_7H_8O, Anisole (I, II) $k_E = 2.3$ (17, 23, 51, 62, 73, 89)

t, °C	γ (air)
10	36.41±0.2
20	35.22±0.1
40	32.81±0.2
60	30.41±0.2
80	28.02±0.2
100	25.66±0.3
125	22.7 ±0.3
150	19.8 ±0.3

$C_7H_8O_2$, Guaiacol (I) $k_E = 2.2$ (61)

t, °C	γ
19.6	38.66
46.0	35.66
78.0	31.90

(I) (14)

t, °C	γ (air)
142	28.1
179	23.9
201	21.3

$C_7H_8O_2$, Resorcinol monomethyl ether (III) (30)

t, °C	γ (N_2) ±2†
− 20	83.1
+107	37.5
206	26.8

$C_7H_8O_2$, Dimethyl-γ-pyrone (I) $k_E = 1.9$ (55)

t, °C	γ (air)‡‡
137	30.8
183	26.3

C_7H_9N, Benzylamine (I)

$k_E = 2.1$ (83)

t, °C	γ (?) ±0.5
20	39.5
30	38.3
45	36.5
60	34.8
75	33.1

C_7H_9N, Methylaniline (I, II) (13, 40, 65)

t, °C	γ (air or vapor)
10	40.7±0.3
20	39.6±0.3
60	35.3±0.3
195	21.0±0.5

C_7H_9N, *o*-Toluidine (I, II, III) (13, 27, 30, 31, 50, 65)

t, °C	γ (air or vapor) ±0.8
0	42.3
20	40.0
50	36.7
100	31.2
150	25.7
200	20.6

C_7H_9N, *m*-Toluidine (I) (65)

At 20°C, $\gamma = 36.9 \pm 0.3$

C_7H_9N, *p*-Toluidine (I, II, III) (13, 50, 81)

t, °C	γ (air) ±0.3
50	34.6
100	29.8
150	25.0
210	19.3

$C_7H_{10}O_4$, Dimethyl citraconate (III) (82.4)

t, °C	γ (air) ±1§§
20	35.69
32	34.51
53	31.37
64	30.78
79	28.20

$C_7H_{10}O_4$, Dimethyl mesaconate (III) (82.4)

t, °C	γ (air) ±1§§
20	34.68
32	33.80
63	29.84
80	27.68

$C_7H_{11}BrO_4$, Diethyl bromomalonate (III) (30)

t, °C	γ (N_2) ±2†
−20.7	39.1
+66.6	29.3
146	24.2

$C_7H_{11}Cl_3O_2$, *act.*-Amyl trichloroacetate (I, II) (29, 44)

t, °C	γ (air or vapor) ±0.2‡
0	31.25
20	29.3
50	26.45
100	21.9
150	17.8±0.3

$C_7H_{11}NO_2$, Butyl cyanoacetate (III) (30)

t, °C	γ (N_2) ±2†
− 21.3	35.2
+114.5	24.6
213.1	17.6

$C_7H_{11}NO_2$, Isobutyl cyanoacetate (III) (30)

t, °C	γ (N_2) ±2†
−20.5	34.2
+94.5	24.9
213	15.4

$C_7H_{12}O_2$, Ethyl cyclobutanecarboxylate (III) (82.7)

t, °C	γ (air) ±1§§
19.5	29.96
47.5	26.58
70	24.10
90.5	21.68

$C_7H_{12}O_4$, Diethyl malonate (II) (39)

t, °C	γ (air) ±0.4
10	33.14
30	30.99
50	28.88

$C_7H_{14}O$, Dipropyl ketone (II) (44)

t, °C	γ (air) ±0.3
10	26.69
30	24.71
40	23.75
60	21.93

$C_7H_{14}O_2$, Heptylic acid (II) (23)

At 20°C, γ (air) $= 28.31 \pm 0.3$

$C_7H_{14}O_2$, Ethyl isovalerate (I, II) (23, 72)

t, °C	γ (air)
20	23.68±0.1
130	13.2 ±0.4

$C_7H_{14}O_2$, Isoamyl acetate (I, II)
$k_E = 2.3$ (47, 62, 72)

t, °C	γ (air) ±0.2
0	26.6
20	24.7
50	21.8
75	19.5
100	17.1
125	14.7
139	13.4

$C_7H_{14}O_2$, Isobutyl propionate (I) (72)

t, °C	a^2 (air) $\pm1.5\%$	γ (air)
7.2	0.05906	
137	0.03544	13.0

$C_7H_{14}O_2$, Propyl butyrate (I) (72)

t, °C	a^2 (air) $\pm1.5\%$	γ (air)
5.8	0.06117	
143.5	0.03621	13.2

$C_7H_{14}O_2$, Propyl isobutyrate (I) (72)

t, °C	a^2 (air) $\pm1.5\%$	γ (air)
5.7	0.05906	
134.8	0.03544	12.9

$C_7H_{15}NO$, Oenanthaldoxime (I)
$k_E = 1.6$ (11)

t, °C	γ ±0.4
54.60	26.38
76.78	24.78
107.15	22.41

For notes †–§§ *see* p. 475.

$C_7H_{17}N$, *n*-Heptylamine (III) (30)

t, °C	γ (N_2) ±2†
−18.5	27.5
+70.9	20.3
145.5	14.4

$C_8H_4Cl_2O_2$, *sym.*-Phthalyl chloride (III) γ (air) (96)

$C_8H_4Cl_2O_2$, *unsym.*-Phthalyl chloride (96)

C_8H_7N, Benzyl cyanide (I, II)
$k_E = 2.2$ (47, 83)

t, °C	γ (air) ±0.3
20	41.8
45	39.0
60	37.3

C_8H_7N, *o*-Tolunitrile (I, II, III) (39, 82.6, 83)

t, °C	γ (air) ±0.5
20	38.2
40	36.0
75	32.1
100	29.5
116	28.0

C_8H_7N, *m*-Tolunitrile (I, II, III) (39, 82.6, 83)

t, °C	γ (air) ±0.5
0	39.8
20	37.7
40	35.5
85	30.7

C_8H_7N, *p*-Tolunitrile (I, II, III) (39, 82.6, 83)

t, °C	γ (air) ±0.2
30	36.8
40	35.7
70	32.3
96	29.7

C_8H_7NO, Mandelonitrile (I)
$k_E = 1.9$ (83)

t, °C	γ (?) ±0.5
20	44.3
30	43.4
45	41.9
60	40.4

C_8H_8, Styrene (II) (18)

At 19°C, γ (air) $= 32.14 \pm 0.3$

$C_8H_8N_2O_6$, 4, 5-Dinitro-1, 2-dimethoxybenzene (III) (30)

t, °C	γ (N_2) ±2†
130.8	41.0
182	35.7
208	31.5

C_8H_8O, Acetophenone (I, II)
$k_E = 2.2$ (13, 14, 50)

t, °C	γ (air or vapor) ±0.3
20	39.8
50	36.2
75	33.3
125	27.8
175	22.8

$C_8H_8O_2$, *p*-Methoxybenzaldehyde (III) (30)

t, °C	γ (N_2) ±2†
0	44.9
101	33.7
210	22.9

$C_8H_8O_2$, Methyl benzoate (I)
$k_E = 2.4$ (62, 73)

t, °C	γ (air or vapor)
10	38.8±0.2
20	37.6±0.2
50	34.2±0.3
75	31.2±0.3
100	28.4±0.3
150	23.0±0.3
200	17.6±0.3

$C_8H_8O_3$, Methyl salicylate (III) (30)

t, °C	γ (N_2) ±2†
−19.8	44.2
+94	31.9
212.2	19.8

C_8H_9NO, Acetanilide (I)
$k_E = 1.9$ (83)

t, °C	γ (?) ±0.5
120	35.6
130	34.7
145	33.3
160	32.0

C_8H_9NO, *anti*-Benzaldoxime *N*-methyl ether (III) (82)

t, °C	γ (air) ±1§§
100	40.93
122	38.62
141	36.80
163	34.53

C_8H_9NO, *anti*-Benzaldoxime *O*-methyl ether (III) (82)

t, °C	γ (air) ±1§§
16.5	37.03
33.5	34.92
55.5	32.20
73	30.13

C_8H_9NO, Phenylacetamide (I)
$k_E = 1.6$ (83)

t, °C	γ (?) ±0.5
160	34.0
170	33.2
180	32.4

$C_8H_9NO_3$, *p*-Nitrophenetole (III) (30)

t, °C	γ (N_2) ±2†
70.2	35.3
140	29.3
220	22.6

C_8H_{10}, Ethylbenzene (I, II) (18, 40, 65, 66, 72)

t, °C	γ (air)
0	31.40±0.2
20	29.20±0.2
35	27.60±0.2
60	24.91±0.2
135	16.9 ±0.3

C_8H_{10}, *o*-Xylene (I, II) (23, 40, 66)

t, °C	γ (air) ±0.3
0	32.27
20	30.10
40	27.90
60	25.70

C_8H_{10}, *m*-Xylene (I) k_E = 2.25 (20, 62, 65, 66, 72, 89)

t, °C	γ (air)¶	γ (vapor) ±0.4
0	31.15±0.1	31.15
20	28.90±0.1	28.90
40	26.70±0.1	26.70
60	24.57±0.1	24.57
100	20.46±0.2	20.46
135	17.18±0.3	17.18

C_8H_{10}, *p*-Xylene (II) (23, 40, 65, 66, 72)

t, °C	γ (air)
5	29.92±0.2
20	28.37±0.1
35	26.80±0.2
60	24.20±0.2
135	16.7 ±0.3

$C_8H_{10}O$, *p*-Tolyl methyl ether (I) (73)

$a^2 = 0.075037 - 0.0001838t$

t, °C	a^2 ±2%	γ
5.5	0.0740	
48.7	0.0661	
75.5	0.0612	
92.5	0.0580	
175.5	0.0428	17.4

$C_8H_{10}O$, Phenetole (I, II) k_E = 2.4 (23, 51, 62, 73)

t, °C	γ (air)
20	32.74±0.1
50	29.5 ±0.2
100	24.2 ±0.2
150	18.9 ±0.2
170	16.8 ±0.2

$C_8H_{10}O_2$, *o*-Dimethoxybenzene (III) (30)

t, °C	γ (N_2) ±2†
0.0	42.5
104.5	29.3
196	20.8

$C_8H_{10}O_2$, *m*-Dimethoxybenzene (I) (73)

$a^2 = 0.077718 - 0.0001709t$

At 215°C, γ = 17.6

t, °C	a^2 ±2%
10.6	0.0759
72.0	0.0654
87.0	0.0628

$C_8H_{10}O_2$, *p*-Dimethoxybenzene (III) (30)

t, °C	γ (N_2) ±2†
66	34.7
146	26.4
206	19.5

$C_8H_{10}O_4$, Dimethyl 3-methyl-Δ²-cyclopropene-1, 2-dicarboxylate (III) (82.7)

t, °C	γ (air) ±1§§
42	35.46
63	32.94
81	30.79
95	28.98

$C_8H_{11}ClO_4$, Diethyl chlorofumarate (I, II) k_E = 2.8 (44, 89)

t, °C	γ (air) ±0.3
15	34.8
40	32.3
60	30.2

$C_8H_{11}ClO_4$, Diethyl chloromaleate (I) k_E = 2.6 (89)

t, °C	γ (air) ±0.3
15.5	34.45
26.3	33.33
50.0	30.83
70.75	28.77
97.05	26.19

$C_8H_{11}N$, Dimethylaniline (I, II) k_E = 2.4 (20, 40, 62, 63)

At 20°C, a^2 (air) = 0.07811; γ (vapor) − γ (air) = 0.10; d_4^{20} = 0.9562

t, °C	γ (air)
10	37.70±0.1
20	36.56±0.05
50	33.20±0.1
75	30.39±0.2
100	27.6 ±0.3
150	22.4 ±0.3
175	20.0 ±0.3

$C_8H_{11}N$, Ethylaniline (I, II) (13, 31, 40, 65)

t, °C	γ (air or vapor) ±0.5
10	37.6
20	36.6
60	32.4
210	16.7

$C_8H_{11}NO_2$, Ethyl 1-cyanocyclobutane-1-carboxylate (III) (82.7)

t, °C	γ (air) ±1§§
13.5	35.68
57	30.92
84.5	27.86
126.5	23.49

$C_8H_{12}BrN$, Phenyldimethylammonium bromide (I) k_E = 1.7 (88)

t, °C	γ (air) ±0.5
82.0	51.60
97.0	50.24
113.5	48.77

$C_8H_{12}O_4$, Diethyl fumarate (I, II) k_E = 2.7 (44, 89)

t, °C	γ (air) ±0.4
20	32.4
45	29.8
75	26.6

$C_8H_{12}O_4$, Diethyl maleate (I) k_E = 2.6 (89)

t, °C	γ (air) ±0.3
19.8	33.38
41.4	31.08
79.35	27.33

$C_8H_{13}BrO_4$, Diethyl methylbromomalonate (III) (30)

t, °C	γ (N_2) ±2†
− 21	35.0
+114	22.6
197	14.7

$C_8H_{13}NO_2$, Amyl cyanoacetate (III) (30)

t, °C	γ (N_2) ±2†
−17.5	32.7
+89	25.0
201	17.8

C_8H_{14}, *n*-Hexylacetylene (I) k_E = 2.4 (90)

t, °C	γ (air) ±0.3
23.0	23.89
39.0	22.22
57.0	20.40
73.6	18.75
92.8	16.92

$C_8H_{14}O_3$, Ethyl dimethylacetoacetate (II) (39)

t, °C	γ (air) ±0.4
30	29.61
40	28.51
50	27.39

$C_8H_{14}O_3$, Ethyl ethylacetoacetate (I) k_E = 2.4 (92)

t, °C	γ ±0.4
38.8	28.1
97.8	22.3
148.3	17.6

$C_8H_{14}O_4$, Diethyl succinate (I) k_E = 2.3 (31)

t, °C	γ (?) ±2
13.0	31.9
70.6	26.5

$C_8H_{14}O_5$, Diethyl malate (II) (44)

t, °C	γ (air) ±0.3
30	35.51
40	32.55
60	30.63

$C_8H_{14}O_6$, Diethyl *d*-tartrate (III) (30)

t, °C	γ (N_2) ±2†
25	37.6
134.7	26.9
212.7	20.2

C_8H_{16}, *n*-Octylene (mixture of 1-*n*-octylene and 2-*n*-octylene) (I, II) (18, 72)

t, °C	γ (air) ±0.3
2	24.0
20	22.2
125	12.4

For notes †–§§ *see* p. 475.

$C_8H_{16}O$, Methyl hexyl ketone (II) (23, 47)

t, °C	γ (air)
0	28.6 ±0.2
20	26.79±0.1
30	25.9 ±0.2

$C_8H_{16}O_2$, Caprylic acid (II) (18)

At 18.1°C, γ (air) = 28.82 ± 0.3

$C_8H_{16}O_2$, Ethyl caproate (II) (20)

At 20°C, γ (air) = 25.81 ± 0.2

$C_8H_{16}O_2$, Isoamyl propionate (I) (72)

t, °C	a^2 (air) ±1.5%	γ (air)
4.5	0.06152	
160.5	0.03459	12.4

$C_8H_{16}O_2$, Isobutyl *n*-butyrate (I) (72)

t, °C	a^2 (air) ±1.5%	γ (air)
5.8	0.06046	
157	0.03361	12.0

$C_8H_{16}O_2$, Isobutyl isobutyrate (I) (72)

t, °C	a^2 (air) ±2%	γ (air)
7.9	0.0583	
149	0.0337	12.0

$C_8H_{16}O_2$, *n*-Propyl isovalerate (I) (72)

t, °C	a^2 (air) ±1.5%	γ (air)
15	0.05857	
155.5	0.03459	12.4

C_8H_{18}, 2, 5-Dimethylhexane (I) (66, 72)

t, °C	γ (air)
0	21.95±0.2
30	18.97±0.2
60	16.16±0.2
110	11.5 ±0.3

C_8H_{18}, 2-Methylheptane (I) (66)

t, °C	p*	γ ±0.1
0.0	9.6	22.85
34.3	10.4	19.48
61.0	57.2	16.94

* p = pressure of air + vapor (in cm of mercury).

C_8H_{18}, *n*-Octane (I, II) k_E = 2.3 (20, 21, 61, 66)

t, °C	γ (air) ±0.1	γ (vapor) ±0.3
0	23.80	23.80
20	21.80	21.80
40	19.82	19.82
60	17.88	17.88

$C_8H_{18}O$, *dl*-Methylhexyl carbinol (II) k_E = 2.1 (9, 21, 23)

t, °C	γ (air) ±0.1
0	27.96
20	26.37
40	24.78
60	23.02

$C_8H_{18}O$, *d*-Methylhexyl carbinol (I) k_E = 2.0 (76)

t, °C	γ**
10	26.6
80	20.8

$C_8H_{18}O$, *l*-Methylhexyl carbinol (I) k_E = 1.9 (76)

t, °C	γ**
10	26.5
80	20.9

$C_8H_{18}O$, *n*-Octyl alcohol (II) (20, 21)

t, °C	γ (air) ±0.2
0.16	29.09
20.00	27.53
39.87	25.85
59.67	24.38

$C_8H_{19}N$, Diisobutylamine (II, III) (23, 30)

t, °C	γ (air)
-70	30.0 ±1.5
+20	22.05±0.2
125	12.7 ±1.5

C_9H_7N, Quinoline (I, II) k_E = 2.4 (7, 40, 45, 62, 73)

t, °C	γ (air) ±0.3
10	46.2
20	45.0
50	41.5
100	35.8
150	30.3
200	25.1
230	22.1

$C_9H_{10}O_2$, Ethyl benzoate (I, III) (30, 31, 73)

t, °C	γ ±0.5
0	37.5
20	35.5
50	32.5
75	30.0
200	17.5

$C_9H_{10}O_3$, Ethyl *m*-hydroxybenzoate (I) k_E = 2.2 (28)

t, °C	γ ±0.4
85.8	35.76
115.4	32.99
143.5	30.28

$C_9H_{10}O_3$, Ethyl *p*-hydroxybenzoate (I) k_E = 2.2 (28)

t, °C	γ ±0.4
119.7	33.71
149.3	31.01
172.8	28.80

$C_9H_{10}O_3$, Ethyl salicylate (I) k_E = 2.4 (28)

t, °C	γ ±0.4
20.5	38.33
61.1	35.06
85.6	31.37

$C_9H_{11}NO$, Methylacetanilide (I) k_E = 2.2 (83)

t, °C	γ (?) ±0.5
105	32.4
115	31.5

$C_9H_{11}NO$.—(*Continued*)

t, °C	γ (?) ±0.5
120	31.0
130	30.0
145	28.5

$C_9H_{11}NO_2$, Phenylurethane (I) k_E = 2.2 (17, 83)

t, °C	γ (?) ±0.4
60	36.5
80	34.5
100	32.5
150	27.6

C_9H_{12}, *p*-Ethyltoluene (I) (72)

t, °C	a^2 (air) ±1.5%	γ (air)
4.5	0.07088	
161.8	0.04184	15.2

C_9H_{12}, Mesitylene (I, II) k_E = 2.2 (23, 40, 62, 72)

t, °C	γ (air)
5	30.1 ±0.2
20	28.51±0.2
50	25.5 ±0.2
75	23.0 ±0.3
100	20.6 ±0.3
125	18.2 ±0.3
165	14.9 ±0.3

C_9H_{12}, *n*-Propylbenzene (I) (72)

t, °C	γ (air) ±0.4
4.5	30.6
158.7	15.3

C_9H_{12}, Pseudocumene (III) (30)

t, °C	γ (N_2) ±2.0†
−21	34.1
+86.5	24.0
166	16.2

$C_9H_{12}O$, *dl*-Phenylethyl carbinol (I) k_E = 2.0 (76)

t, °C	γ‡‡
10	34.9
80	28.4

$C_9H_{12}O$, *l*-Phenylethyl carbinol (I) k_E = 2.0 (76)

t, °C	γ‡‡
10	34.7
80	28.3

$C_9H_{13}N$, Dimethyl-*o*-toluidine (I) (13, 27)

t, °C	γ ±1.0
15	32.9
150	18.2

$C_9H_{14}O$, Phorone (I) (14)

t, °C	a^2 (air) ±2%
132	0.0520
160	0.0470
191	0.0418

$C_9H_{14}O_3$, Ethyl allylacetoacetate (I) k_E = 2.6 (92)

t, °C	γ ±0.4
39.2	28.5
105.7	22.2
121.2	20.8

For notes †–§§ *see* p. 475.

$C_9H_{14}O_4$, Diethyl cyclopropane-1, 1-dicarboxylate (III) (82.7)

t, °C	γ (air) ±1§§
25	31.28
110	22.62
153	18.52
189	15.52

$C_9H_{14}O_4$, Diethyl cyclopropane-1, 2-dicarboxylate (III) (82.7)

t, °C	γ (air) ±1§§
11	33.41
14	33.22
54	28.92
71	27.29
90	25.17

$C_9H_{14}O_6$, Glyceryl triacetate (III) (30)

t, °C	γ (N_2) ±2†
−19	37.8
+99.8	30.1
200.3	20.4

$C_9H_{16}O_3$, Ethyl *n*-?-propylacetoacetate (III) (30)

t, °C	γ (N_2) ±2†
−76.2	43.6
+70	24.8
200.5	14.2

$C_9H_{17}BrO_2$, *act.*-Amyl α (?)-bromo-*n*-butyrate (I) k_E = 2.6 (90)

t, °C	γ (air) ±0.3‡
17.1	29.55
44.9	26.96
75.8	24.12
103.5	21.50

$C_9H_{18}O_2$, *act.*-Amyl butyrate (I, II) k_E = 2.4 (29, 44)

t, °C	γ (air or vapor) ±0.3‡
0	27.1
20	25.2
60	21.5
80	19.8
110	17.3

$C_9H_{18}O_2$, Isoamyl butyrate (II) (23)

At 20°C, γ (air) = 25.19 ± 0.2

$C_9H_{18}O_2$, Isobutyl isovalerate (I, II) k_E = 2.6 (29, 44)

t, °C	γ (air or vapor) ±0.3
0	26.1
20	24.2
60	20.6
105	16.5

C_9H_{20}, Tetraethylmethane (I) k_E = 2.2 (38)

t, °C	γ‡‡
20	22.9
40	21.2

$C_9H_{21}N$, Tri-*n*-propylamine (I) k_E = 2.7 (83)

t, °C	γ (?) ±0.5
20	23.2
30	22.3

$C_9H_{21}N$.—(*Continued*)

t, °C	γ (?) ±0.5
45	20.8
60	19.4
75	18.0

$C_{10}H_7Br$, α-Bromonaphthalene (II) (25)

At 20°C, γ (air) = 44.59 ± 0.3

$C_{10}H_7Cl$, α-Chloronaphthalene (II) (25)

At 20°C, γ (air) = 41.80 ± 0.3

$C_{10}H_8$, Naphthalene (I) (13, 14)

t, °C	γ (air or vapor) ±1
127	28.8
170	24.0
190	21.8

$C_{10}H_9BrO_2$, Methyl α-bromoallocinnamate (III) (82.4)

t, °C	γ (air) ±1§§
20	43.41
30	42.30
60	38.77
81	36.10

$C_{10}H_9BrO_2$, Methyl β-bromoallocinnamate (III) (82.4)

t, °C	γ (air) ±1§§
66	36.04
71	35.23
86	33.54
94	32.70

$C_{10}H_9BrO_2$, Methyl α-bromocinnamate (III) (82.4)

t, °C	γ (air) ±1§§
20	45.59
51	41.80
81	38.22
131	31.57

$C_{10}H_9BrO_2$, Methyl β-bromocinnamate (III) (82.4)

t, °C	γ (air) ±1§§
20	44.79
32	42.36
61	39.96
77	37.49

$C_{10}H_{10}O$, Benzylideneacetone (I) k_E = 2.6 (16)

t, °C	γ (air) ±*ca.* 1.5
60.0	39.9
67.8	39.2
80.0	37.9
110.5	34.3
137.5	31.5
155.0	29.6
199.0	25.2

$C_{10}H_{10}O_2$, Methyl allocinnamate (III) (82.4)

t, °C	γ (air) ±1§§
20	40.17
41	37.53
62	34.93
78	32.88

$C_{10}H_{10}O_2$, Methyl cinnamate (I, II, III) (39, 82.4, 89)

t, °C	γ (air) ±0.5
20	39.5
50	36.5
100	31.4

$C_{10}H_{12}O$, Anethole (I, II) k_E = 2.3 (50, 62)

t, °C	γ (air) ±0.5
10	37.6
20	36.5
50	33.3
100	28.4
150	23.8
200	19.6
220	18.1

$C_{10}H_{12}O$, Cumic aldehyde (I) (73)

$a^2 = 0.07397 - 0.0001505t$

At 237.0°C, γ = 14.8

t, °C	a^2 ±2%
8.8	0.07265
48.4	0.06669
70.5	0.06336
94.5	0.05975
125.5	0.05509

$C_{10}H_{12}O_3$, Methyl *d*-β-hydroxy-β-phenylpropionate (I) k_E = 2.4 (76)

t, °C	γ‡‡
10	40.7
80	33.3

$C_{10}H_{12}O_3$, Methyl *dl*-β-hydroxy-β-phenylpropionate (I) k_E = 2.4 (76)

t, °C	γ‡‡
10	40.0
80	33.1

$C_{10}H_{13}NO$, Ethylacetanilide (I) k_E = 2.6 (83)

t, °C	γ (?) ±0.5
60	34.6
75	33.1
90	31.5
105	29.9

$C_{10}H_{14}$, 1, 2, 4, 5-Tetramethylbenzene (I) (13)

t, °C	γ ±0.4
108.5	22.07
210.2	13.45

$C_{10}H_{14}$, *p*-Isopropyltoluene (I, II) k_E = 2.3 (18, 23, 40, 62, 72)

t, °C	γ (air)
5	29.5±0.2
20	28.1±0.1
50	25.3±0.2
100	20.7±0.2
150	16.1±0.3
176	13.8±0.4

$C_{10}H_{14}O$, Carvol (I) (73)

$a^2 = 0.076947 - 0.0001611t$

At 227.5°C, γ = 15.6

$C_{10}H_{14}O$.—(*Continued*)

t	a^2 ±2%
10.5	0.07525
45.7	0.06757
91.5	0.06220
137.5	0.05479

$C_{10}H_{14}O$, *dl*-β-Phenylethylmethyl carbinol (I) k_E = 2.2 (76)

t, °C	γ‡‡
10	36.7
80	30.1

$C_{10}H_{14}O$, *d*-β-Phenylethylmethyl carbinol (I) k_E = 2.0 (76)

t, °C	γ‡‡
10	36.5
80	30.3

$C_{10}H_{14}O$, *l*-β-Phenylethylmethyl carbinol (I) k_E = 2.2 (76)

t, °C	γ‡‡
10	36.7
80	30.2

$C_{10}H_{14}O$, Thymol (III) (30)

t, °C	γ (N_2) ±2†
0	34.2
115	25.3
211	17.9

$C_{10}H_{14}O_4$, "labile" Diethyl 3-methyl-Δ^2-cyclopropene-1, 2-dicarboxylate (III) (82.7)

t, °C	γ (air) ±1§§
26	33.98
50	31.13
77	27.99

$C_{10}H_{14}O_4$, "normal" Diethyl 3-methyl-Δ^2-cyclopropene-1, 2-dicarboxylate (III) (82.7)

t, °C	γ (air) ±1§§
41.5	31.42
51	30.33
62	29.12
77.5	27.52

$C_{10}H_{15}N$, Diethylaniline (I) (13, 31, 65)

t, °C	γ
15	34.7±0.3
20	34.2±0.3
50	31.1±0.3
110	24.9±0.5
210	14.7±0.7

$C_{10}H_{16}$, *dl*-Limonene (I) k_E = 2.3 (37)

t, °C	γ‡‡
10	28.1
90	20.8

$C_{10}H_{16}$, *d*-Limonene (I) k_E = 2.3 (37)

t, °C	γ‡‡
10.9	28.5
90.3	21.2

$C_{10}H_{16}$, *l*-Limonene (I) k_E = 2.2 (37)

t, °C	γ‡‡
6.2	28.5
95.5	20.5

$C_{10}H_{16}$, *dl*-Pinene (I) k_E = 2.3 (37)

t, °C	γ‡‡
10	27.0
90	19.5

$C_{10}H_{16}$, *d*-Pinene (I) k_E = 2.4 (37)

t, °C	γ‡‡
12.6	27.2
91.4	19.8

$C_{10}H_{16}$, *l*-Pinene (I) k_E = 2.3 (37)

t, °C	γ‡‡
11.4	27.3
93.8	19.6

$C_{10}H_{16}$, Sylvestrene (III) (30)

t, °C	γ (N_2) ±2†
−70	35.7
+55.5	23.2
149.5	14.6

$C_{10}H_{16}$, Terebene (III) (30)

t, °C	γ (N_2) ±2†
−74	35.8
+86.3	21.1
170	13.9

$C_{10}H_{16}O_2$, α-Campholenic acid (III) (30)

t, °C	γ (N_2) ±2†
0	37.0
117	26.4
212	18.8

$C_{10}H_{16}O_4$, Diethyl cyclobutane-1, 1-dicarboxylate (III) (82.7)

t, °C	γ (air) ±1§§
15	32.51
49	28.70
81	25.24

$C_{10}H_{18}O$, Linalool (I) k_E = 2.3 (62)

t, °C	γ (air) ±0.3
8.0	28.74
34.0	26.42
55.0	24.55
78.0	22.83
109.0	20.20
124.7	18.85

$C_{10}H_{18}O_2$, α-Dihydrocampholenic acid (III) (30)

t, °C	γ (N_2) ±2†
0	34.3
95	25.3
195.3	18.9

$C_{10}H_{18}O_3$, Ethyl diethylacetoacetate (II) (39)

t, °C	γ (air) ±0.4
30	28.24
40	27.25
50	26.29

For notes †-§§ *see* p. 475.

$C_{10}H_{22}$, Diisoamyl (I, II) (23, 47, 72)

t, °C	γ (air)
0	23.96±0.2
20	22.24±0.1
30	21.41±0.2
160	10.7 ±0.3

$C_{10}H_{22}O$, Isoamyl ether (I) k_E = 2.2 (31)

t, °C	γ (?) ±2
17.8	23.2
64.0	19.5

$C_{10}H_{23}N$, Diisoamylamine (III) (30)

t, °C	γ (N_2) ±2†
−20	26.5
+80.8	17.9
178.5	10.8

$C_{11}H_{10}O_2$, Ethyl phenylpropiolate (I) k_E = 2.4 (89)

t, °C	γ (air) ±0.3
15.6	39.68
35.4	37.57
66.5	34.31
81.5	32.78
99.9	30.94

$C_{11}H_{12}O$, Benzylidene methyl ethyl ketone (I) k_E = 2.7 (16)

t, °C	γ (air) ±*ca.* 1.5
59.5	38.5
67.0	37.5
82.0	36.1
110.5	32.9
124.0	31.6
138.0	30.3
180.0	25.7

$C_{11}H_{12}O_2$, Ethyl cinnamate (I, II) (18, 39, 89)

t, °C	γ_1 (air)	γ_2 (air)
7	39.87	
15	38.93	
20	38.37	
25	37.80	37.10
30	37.25	36.61
41	36.09	35.52
50		34.68
100		29.82

$C_{11}H_{12}O_3$, Ethyl β-hydroxy-α-phenylacrylate (I) (92)

t, °C	γ ±0.4
37.3	36.0
68.9	32.3
118.9	27.4

$C_{11}H_{14}O_2$, Ethyl hydrocinnamate (II) (18)

At 21.5°C, γ (air) = 35.08 ± 0.3

$C_{11}H_{16}$, Pentamethylbenzene (I) (13)

t, °C	γ ±0.4
108.1	24.65
207.4	16.32

$C_{11}H_{18}O_4$, Diethyl caronate (Ethyl *trans*-3, 3-dimethylcyclopropane-1, 2-dicarboxylate) (III) (82.7)

t, °C	γ (air) ± 1§§
12	31.56
54	27.10
75	25.00
93.5	23.15

$C_{11}H_{18}O_6$, Diethyl *O*-propionylmalate (I) k_E = 2.9 (29)

t, °C	γ ± 0.3
56.2	28.86
107.4	23.97
149.0	20.46

$C_{11}H_{20}$, *n*-Nonylacetylene (I) k_E = 2.5 (90)

t, °C	γ (air) ± 0.3
20.3	28.47
36.6	26.90
55.6	25.10
75.8	23.29
92.5	21.82

$C_{11}H_{20}O_2$, Undecylenic acid (II) (23)

At 25°C, γ (air) = 30.64 $\pm$ 0.3

$C_{11}H_{20}O_3$, Ethyl isoamylacetoacetate (I) (92)

t, °C	γ ± 0.4
35.6	26.8
97.5	21.6
139.0	18.1

$C_{11}H_{22}O_2$, Ethyl *n*-nonylate (II) (20)

At 20°C, γ (air) = 28.04 $\pm$ 0.2

$C_{12}H_{10}$, Acenaphthene (I) (13)

t, °C	γ ± 0.4
128.6	32.3
178.7	27.4

$C_{12}H_{10}$, Diphenyl (I) (13)

t, °C	γ ± 0.4
129.2	29.5
179.7	24.8

$C_{12}H_{10}N_2O$, Azoxybenzene (III) (82)

t, °C	γ (air) ± 1§§
51	43.34
66.5	41.42
77.5	40.26
89	39.17

$C_{12}H_{11}N$, Diphenylamine (I, III) (14, 30, 56, 83)

t, °C	γ (air or vapor) ± 1.0
80	37.7
150	30.7
200	26.0
275	19.8

$C_{12}H_{14}O_4$, Diethyl phthalate (I, II) (18, 44, 89)

t, °C	γ (air)	k_E
10	38.5 $\pm$ 0.3	
20	37.5 $\pm$ 0.2	3.1
50	34.5 $\pm$ 0.3	
75	32.0 $\pm$ 0.3	
94	30.1 $\pm$ 0.4	2.6

$C_{12}H_{14}O_4$, *dl*-Ethyl benzoyllactate (I, II) k_E = 3.0 (29, 44)

t, °C	γ (air or vapor) ± 0.3
15	37.5
20	36.9
60	32.8
110	27.6

$C_{12}H_{16}O_2$, *n*-Propyl hydrocinnamate (I) k_E = 2.8 (89)

t, °C	γ (air) ± 0.3
19.0	34.50
31.7	33.15
47.9	31.52
62.1	30.05
80.5	28.31

$C_{12}H_{16}O_2$, Isopropyl hydrocinnamate (I) k_E = 2.7 (89)

t, °C	γ (air) ± 0.3
18.5	33.27
42.0	30.96
51.7	30.00
71.7	28.07
100.6	25.27

$C_{12}H_{18}O_6$, Triethyl aconitate (I) k_E = 3.2 (90)

t, °C	γ (air) ± 0.3
20.3	34.55
34.8	33.04
51.0	31.36
69.7	29.47
90.6	27.43

$C_{12}H_{20}O_6$, *l*-Diethyl *O*-*n*-butyrylmalate (I, II) k_E = 3.3 (29, 44)

t, °C	γ (air or vapor) ± 0.3
0	33.9
20	31.8
50	28.9
100	24.1
145	20.1

$C_{12}H_{22}O_2$, Ethyl α-dihydrocampholenate (III) (30)

t, °C	γ (N_2) ± 2†
−21	31.0
+95	21.5
194	13.5

$C_{12}H_{27}N$, Triisobutylamine (III) (30)

t, °C	γ (N_2) ± 2†
−21	24.5
+90.3	18.0
185	11.0

$C_{13}H_6Cl_4O$, 3, 4, 3′, 4′-Tetrachlorobenzophenone (III) (30)

t, °C	γ (N_2) ± 2†
154	35.1
186.5	32.1
220	29.3

$C_{13}H_6Cl_6$, 2, 4, 2′, 4′-Tetrachlorobenzophenone dichloride (III) (30)

t, °C	γ (N_2) ± 2†
156	31.2
185.5	29.9
218	27.9

$C_{13}H_{10}O$, Benzophenone (I, II) k_E = 2.9 (13, 50, 89)

t, °C	γ (air or vapor) ± 0.4
10	46.2
20	45.1
50	41.8
90	37.4

$C_{13}H_{10}O_3$, Diphenyl carbonate (III) (82)

t, °C	γ (air) ± 1§§
101	34.28
120.5	32.19
139	30.41

$C_{13}H_{10}O_3$, Phenyl salicylate (III) (30)

t, °C	γ (N_2) ± 2†
0	45.7
90.1	36.8
211.6	26.3

$C_{13}H_{12}$, Diphenylmethane (I, II) (13, 24, 40)

t, °C	γ (air)
30	37.1 $\pm$ 0.5
60	34.9 $\pm$ 0.5
210	24 $\pm$ 2.0

$C_{13}H_{12}O$, Benzohydrol (I) k_E = 2.2 (28)

t, °C	γ ± 0.4
73.55	38.65
90.9	37.06

$C_{13}H_{14}O_2$, Isobutyl phenylpropiolate (I) k_E = 2.3 (89)

t, °C	γ (air) ± 0.3
16.7	35.34
34.6	33.71
62.0	31.23
93.0	28.39

$C_{13}H_{16}O$, Benzalpinacolin (I) k_E = 2.6 (16)

t, °C	γ (air) $\pm$ *ca.* 1.5
62.0	32.8
83.0	30.9
110.3	28.6
137.1	26.0
156.0	24.5
199.0	20.6

$C_{13}H_{22}O_6$, *l*-Diethyl *O*-*n*-valerylmalate (I) k_E = 3.5 (29)

t, °C	γ ± 0.3
16.3	31.51
54.7	27.52
107.4	23.20
147.8	19.93

For notes †–§§ see p. 475.

$C_{13}H_{24}O_4$, Di-*act.*-amyl malonate (I, II) k_E = 2.8 (44, 89)

t, °C	γ (air)‡
25	27.9 $\pm$ 0.7
60	25.1 $\pm$ 0.6
100	21.9 $\pm$ 0.5

$C_{14}H_{10}O_2$, Benzil (III) γ (air) (96)

$C_{14}H_{12}O_2$, Benzyl benzoate (III) (30)

t, °C	γ (N_2) ± 2†
21.8	47.4
90.8	35.8
210.5	26.6

$C_{14}H_{14}$, *sym.*-Diphenylethane (I) (13)

t, °C	γ ± 0.4
108.3	29.09
210.2	19.95

$C_{14}H_{14}$, 1, 1-Diphenylethane (II) (24)

t, °C	γ (air) ± 0.5
20	37.67
25	37.20

$C_{14}H_{14}N_2O$, *o*, *o*′-Azoxytoluene (III) (82)

t, °C	γ (air) ± 1§§
69.5	40.41
78.5	39.39
90.5	38.33
101	37.25

$C_{14}H_{14}N_2O_3$, *p*, *p*′-Azoxyanisole (I) (67)

t, °C	γ
116.3	38.62
133.3	37.27
135.1	37.01
153.3	35.60

(III) (30)

t, °C	γ (N_2)†
115	40.1
160.5	35.5
211	31.4

$C_{14}H_{15}N$, Dibenzylamine (I) k_E = 2.9 (83)

t, °C	γ (?) ± 0.5
20	41.1
30	40.0
45	38.4
60	36.8
75	35.1

$C_{14}H_{20}O_2$, Amyl hydrocinnamate (II) (43)

t, °C	γ (air) ± 0 3
15	32.45
40	30.30

$C_{14}H_{20}O_2$, *act.*-Amyl hydrocinnamate (I) k_E = 2.8 (89)

t, °C	γ (air) ± 0.3‡
16.0	33.20
38.4	31.13
57.0	29.43
83.8	27.05
99.8	25.64

$C_{14}H_{23}ClO_4$, Di-*act.*-amyl chlorofumarate (I, II) k_E = 2.9 (44, 89)

t, °C	γ (air)‡
30	29.6 ± 0.6
60	27.2 ± 0.5
100	24.0 ± 0.5

$C_{14}H_{23}N$, Diisobutylaniline (III) (30)

t, °C	γ (N_2) ± 2†
0	32.8
92.5	23.9
195.8	15.9

$C_{14}H_{24}O_4$, Di-*act.*-amyl maleate (I) k_E = 2.8 (89)

t, °C	γ (air) ± 0.3‡
17.4	29.59
28.7	28.62
42.8	27.47
61.2	25.97
73.2	25.01
96.8	22.62

$C_{14}H_{24}O_6$, *l*-Diethyl *O*-caproylmalate (I) k_E = 3.1 (29, 62)

t, °C	γ (air or vapor) ± 0.3
10	31.8
20	30.9
50	28.3
100	24.0
145	20.1

$C_{14}H_{26}O_4$, Di-*act.*-amyl succinate (I, II) k_E = 2.9 (44, 89)

t, °C	γ (air) ± 0.7‡
20	28.9
50	26.5
100	22.6

$C_{14}H_{26}O_4$, Diethyl sebacate (I) k_E = 3.3 (90)

t, °C	γ (air) ± 0.3
22.5	32.94
38.7	31.30
55.8	29.65
75.0	27.84
97.6	25.78

$C_{14}H_{26}O_5$, Diamyl malate (II) (44)

t, °C	γ (air) ± 0.3
30	27.96
40	27.28
60	25.95

$C_{15}H_{16}$, 1, 1-Diphenylpropane (II) (24)

t, °C	γ (air) ± 0.5
20	37.15
25	36.64

$C_{15}H_{16}$, Di-*p*-tolylmethane (II) (24)

t, °C	γ (air) ± 0.5
20	35.51
25	34.80

$C_{15}H_{22}O_8$, Tetraethyl cyclopropane -1, 1, 2, 2-tetracarboxylate (III) (82.7)

$C_{15}H_{22}O_8$.—(*Continued*)

t, °C	γ (air) ± 1§§
76	29.08
97	27.08
122	24.75
152	21.93

$C_{15}H_{26}O_4$, Di-*act.*-amyl citraconate (I) k_E = 2.9 (89)

t, °C	γ (air) ± 0.3‡
24.8	28.78
46.5	26.91
66.6	25.29
82.6	24.00
99.9	22.65

$C_{15}H_{26}O_4$, Di-*act.*-amyl mesaconate (I) k_E = 2.9 (89)

t, °C	γ (air) ± 0.3‡
27.4	29.16
42.0	27.96
60.1	26.45
74.5	25.26
101.1	23.16

$C_{15}H_{26}O_6$, Tributyrin (III) (30)

t, °C	γ (N_2) ± 2†
−20.5	33.0
+99.8	25.5
200.8	18.3

$C_{15}H_{26}O_6$, *l*-Diethyl *O*-*n*-heptoylmalate (I, II) k_E = 3.2 (29, 44)

t, °C	γ (air or vapor) ± 0.3
0	32.6
20	30.9
60	27.4
145	20.0

$C_{15}H_{33}N$, Triisoamylamine (I) k_E = 3.2 (83)

t, °C	γ (?) ± 0.5
20	24.5
30	23.6
45	22.3
60	21.1
75	19.8

$C_{16}H_{14}O_4$, *o*, *o*-Dimethoxybenzil (III) γ (air) (96)

$C_{16}H_{16}NO_2$, Anisaldazine (III) (30)

t, °C	γ (N_2) ± 2†
171	32.1
180.5	31.2
230.5	26.8

$C_{16}H_{18}N_2O_3$, *p*-Azoxyphenetole (I) (67)

t, °C	γ
134.9	30.77
165.1	28.44
169.4	28.06
183.8	27.01

(III) (30)

t, °C	γ (N_2)†
142.5	31.6
174.5	28.6
219	25.2

$C_{16}H_{22}O_4$, Diethyl ethylbenzylmalonate (III) (30)

t, °C	γ (N_2) ± 2†
0	39.0
106	28.1
206.5	19.7

$C_{16}H_{28}O_6$, *l*-Diethyl *O*-*n*-octoylmalate (I, II) k_E = 3.2 (29, 44)

t, °C	γ (air or vapor)
0	32.5 ± 0.2
20	30.7 ± 0.2
50	28.1 ± 0.3
100	23.8 ± 0.3
145	20.3 ± 0.3

$C_{16}H_{34}N_2S$, Triisoamylammonium thiocyanate (I) k_E = 1.5 (88)

t, °C	γ (air) ± 0.3
80	30.31
100	29.39
122	28.42

$C_{17}H_{14}O_3$, Dibenzoylacetone (I) (69)

t, °C	γ ± *ca.* 2.0
109.5	35.3
169.7	30.1

$C_{17}H_{30}O_6$, *l*-Diethyl *O*-*n*-nonoylmalate (I, II) k_E = 3.9 (29, 44)

t, °C	γ (air or vapor)
0	32.5 ± 0.4
20	30.8 ± 0.3
50	28.1 ± 0.3
100	23.8 ± 0.3
145	20.3 ± 0.3

$C_{18}H_{15}O_4P$, Triphenyl phosphate (III) (82)

t, °C	γ (air) ± 1§§
65.5	40.63
74	39.64
84	38.71

$C_{18}H_{15}P$, Triphenylphosphine (I) k_E = 3.3 (89)

t, °C	γ (air) ± 0.4
45.7	42.04
68.8	39.74
95.9	36.94
107.1	35.80

$C_{18}H_{15}Sb$, Triphenylstibine (I) k_E = 2.9 at 35°C; 3.6 at 100°C (89)

t, °C	γ (air) ± 0.3
35.1	43.01
63.1	40.37
91.2	37.32
103.0	36.08

$C_{18}H_{18}N_2O_5$, Ethyl *p*-azoxybenzoate (III) (30)

t, °C	γ (N_2) ± 2†
114	27.0
140	26.2
230	25.3

For notes †–§§ *see* p. 475.

$C_{18}H_{26}O_4$, Di-*act.*-amyl phthalate (I, II) (44, 89)

t, °C	γ (air) ± 0.7‡	k_E
20	31.5	3.3
60	28.6	
105	25.2	2.5

$C_{18}H_{32}O_6$, *l*-Diethyl *O*-*n*-decoylmalate (I, II) k_E = 3.7 (29, 44)

t, °C	γ (air or vapor)
0	32.8 ± 0.4
20	31.0 ± 0.4
50	28.3 ± 0.3
100	23.0 ± 0.3
145	20.5 ± 0.3

$C_{18}H_{34}O_2$, Oleic acid (II) (18, 20)

At 20°C, γ (air) = 32.50 ± 0.3

$C_{18}H_{34}O_3$, Ricinoleic acid (II) (18)

At 16°C, γ (air) = 35.81 ± 0.3

$C_{19}H_{16}$, Triphenylmethane (I) (56)

At 125°C, k_E = 2.1; at 300°C, k_E = 1.5

t, °C	γ ± *ca.* 1
108.7	33.8
130.5	31.4
154.0	28.8
208.2	24.5
229.6	23.0
278.7	19.2
335.5	15.4

$C_{19}H_{16}O$, Triphenyl carbinol (I) k_E = 2.2 (28)

t, °C	γ ± 0.4
165.8	30.38
190.5	28.67

$C_{20}H_{38}O_4$, Diisoamyl sebacate (I) k_E = 3.4 (90)

t, °C	γ (air) ± 0.3
23.5	30.86
35.9	29.83
52.0	28.50
64.8	27.50
80.5	26.23
95.1	25.08

$C_{20}H_{44}IN$, Tetraisoamylammonium iodide (I) k_E = 1.8 (88)

t, °C	γ (air) ± 0.3
99.5	27.27
109.5	26.84
119.0	26.39
130.5	25.88

$C_{21}H_{21}N$, Tribenzylamine (I) k_E = 3.6 (83)

t, °C	γ (?) ± 0.5
95	33.7
105	32.8
120	31.3
135	29.8

$C_{21}H_{23}NO_3$, Ethyl *p*-ethoxybenzalamino-α-methylcinnamate (III) (30)

t, °C	γ (N_2) ±2†
85	28.7
123.7	28.3
179	27.7

$C_{21}H_{38}O_6$, Tricaproin (III) (30)

t, °C	γ (N_2) ±2†
−20	33.4
+99.8	25.3
200	19.6

$C_{22}H_{42}O_3$, Isobutyl ricinoleate (I) k_E = 3.4 (87)

t, °C	γ (air) ±0.3
23	31.30
55.5	28.81
85.3	26.49

$C_{23}H_{46}O_2$, *act.*-Amyl stearate (I, II) k_E = 3.5 (29, 44)

t, °C	γ (air or vapor) ±0.3‡
30	29.1
50	27.6
100	24.0
150	20.4

$C_{26}H_{54}$, *n*-Hexacosane (I) k_E = 3.9 (70)

t, °C	γ‡‡
91.7	24.8
121.8	22.5
158.3	19.9

$C_{27}H_{50}O_6$, Tricaprylin (III) (30)

t, °C	γ (N_2) ±2†
0	30.1
99.8	25.1
200.2	19.7

$C_{30}H_{62}O$, Myricyl alcohol (I) k_E = 4.2 (70)

t, °C	γ‡‡
95.3	26.2
131.3	23.4
158.2	21.6

$C_{33}H_{62}O_6$, Tricaprin (III) (30)

t, °C	γ (N_2) ±2†
35.4	27.6
121	23.0
201.2	18.8

$C_{34}H_{50}O_2$, Cholesteryl benzoate (I) (67)

t, °C	γ‡‡
147.4	23.8
177.2	22.9
181.4	22.9
210.2	21.8

$C_{39}H_{74}O_6$, Trilaurin (III) (30)

t, °C	γ (N_2) ±2†
64.7	29.2
139	25.1
200	22.1

$C_{51}H_{98}O_6$, Tripalmitin (I) k_E = 5.4 (87)

t, °C	γ (air) ±0.3
55.7	29.47
65.9	28.78
76.9	27.98
87.6	27.19
96.7	26.56
115.3	25.32

$C_{57}H_{104}O_6$, Triolein (III) (30)

t, °C	γ (N_2) ±2†
17	40.1
99.8	29.3
200.6	25.0

$C_{57}H_{110}O_6$, Tristearin (I) k_E = 5.5 (87, 92)

t, °C	γ (air or vapor)
60	29.6
100	26.8
130	24.7

$C_{60}H_{122}$, *n*-Hexacontane (I) k_E = 5.5 (70)

t, °C	γ‡‡
115.4	24.2
159.9	21.6
190.6	19.8

For notes †–§§ *see* p. 475.

LITERATURE

(For a key to the periodicals see end of volume)

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SURFACE TENSION OF SOLUTIONS

ABBREVIATIONS AND SYMBOLS; *v. further* p. 433

M = Moles per kg solvent.
M/l_s = Moles per liter solution.
g/l_s = grams per liter solution.
x_A = Mole fraction of A.

CONTENTS

The values for *pure liquids* which appear in the tables of this section are not the best values but are those obtained with the liquid actually used in preparing the solutions (corrected, however, for obvious errors, such as the use of too small a tube for the larger tube in the capillary-height method). The use of these values is necessary in order to give the best values of Δγ and the proper shape to the γ-composition curves.

See p. 474, 475 for effect of various inorganic gases and p. 475 for effect of organic vapors on the surface tension at the interface, liquid—gas.

Aqueous Solutions, One Solute

𝔅-TABLE,* STANDARD ARRANGEMENT (*v.* Vol. III, p. viii)

* Very dilute aqueous salt solutions have heen studied hy Gradenwitz (15, 22) and Kleine (22, 25). The results of these workers indicate that dγ/dM decreases as M increases. The value of Δγ found hy them for relatively large values of M do not agree well with reliable modern determinations. Therefore, their results are not reproduced in these tables. Until their work is repeated the shape of the Δγ-M curves in dilute solutions (M < 0.2) will remain uncertain.

H_2O_2 (I) (32)

Wt. %	γ (air) ±*ca.* 0.3
0°C	
0.00	75.64
12.54	76.06
27.22	76.41
34.58	76.70
56.06	77.46
86.31	78.46
18°C	
0.00	72.97
12.78	73.37
28.14	73.82
44.31	74.28
60.83	74.88
90.66	75.82

HCl, 20°C (I, II) (44, 51, 61)

M	Δγ (air)
0.5	−0.16±0.1
1.0*	−0.28±0.1
2.0	−0.48±0.2
4.0	−0.85±0.3
6.0	−1.25±0.3
9.0	−2.2 ±0.3
17.7	−6.8 ±1.5

* 0° and 30°C for M = 1 (33).

HBr, 18°C (I) (51)

M	Δγ (air) ±0.2
0.699	−0.38
1.497	−0.69

H_2SO_4, values of γ (air or vapor) (I, II) (34, 51); *v.* Fig. 2

98.5% (I, II) (1, 34, 51)

t, °C	γ (air or vapor)
10	55.5±0.5
20	55.1±0.5
100	52.5±1.0
150	51 ±2.0
200	49 ±2.0
250	46 ±2.0

HNO_3, 15–20°C (I, III) (44, 51, 64)

M	Δγ (air)
0.7	−0.6±0.2
1.5	−1.1±0.2
2.8	−1.8±0.5
8.5	−4.4±1.0

99.8% (I) (1)

t, °C	γ ±*ca.* 2.0
11.6	42.7
46.2	37.2
78.2	32.6

NH_4OH, 18°C (I, V) (7, 51, 55, 70)

M	Δγ (air)
0.5	− 1.35±0.3
1.0	− 2.35±0.3
1.5	− 3.1 ±0.3
3.0	− 5.2 ±0.3
6.0	− 7.8 ±0.4
10.0	−10.1 ±0.5
15.0	−12.0 ±0.5
20.0	−13.4 ±0.5
23.0	−14.0 ±0.5
34.0	−16.0 ±0.5

NH_4NO_3, 20 and 100°C (I, II, III, IX) (12, 33, 48, 51, 54)

M	Δγ (air)
0.5	0.5 ±0.1
1.0	1.0 ±0.1
2.0	1.9 ±0.1
3.0	2.77±0.15
4.0	3.58±0.15
5.0	4.34±0.2
6.0	5.07±0.2
8.0	6.40±0.2
10.0	7.55±0.2
12.0	8.57±0.2
14.0	9.37±0.2

NH_4Cl (I, II, III, IX) (12, 14, 25, 33, 51, 54, 61)

0°C	
1.0	1.39 ±0.3
20°C	
0.025	0.05 ±0.03
0.1	0.155±0.03
0.25	0.355±0.03
0.5	0.71 ±0.05
1.0	1.39 ±0.10
10, 20 and 30°C	
2.0	2.6 ±0.2
3.0	3.7 ±0.2
4.0	4.8 ±0.2
5.0	5.8 ±0.2
6.0	6.9 ±0.2
6.7	7.6 ±0.2

NH_4Br, 15–20°C (I) (51, 59)

0.7	0.94±0 1
1.5	1.9 ±0.1
2.25	2.7 ±0.2

NH_4I, 18°C (I) (51)

0.7	0.52±0.2
1.5	1.11±0.2

$(NH_4)_2SO_4$, 10–20°C (I, III, IX) (12, 51, 54)

0.5	1.09±0.1
1.0	2.17±0.2
2.0	4.35±0.3
3.0	6.50±0.3
4.0	8.67±0.3
4.8	10.38±0.3

H_3PO_4 (33)

$(NH_4)_2HPO_4$ (54)

$Pb(NO_3)_2$, 15°C (III, IX) (12, 54)

0.5	0.90±0.2
1.1	2.00±0.3

$Pb(C_2H_3O_2)_2$, Acetate (38)

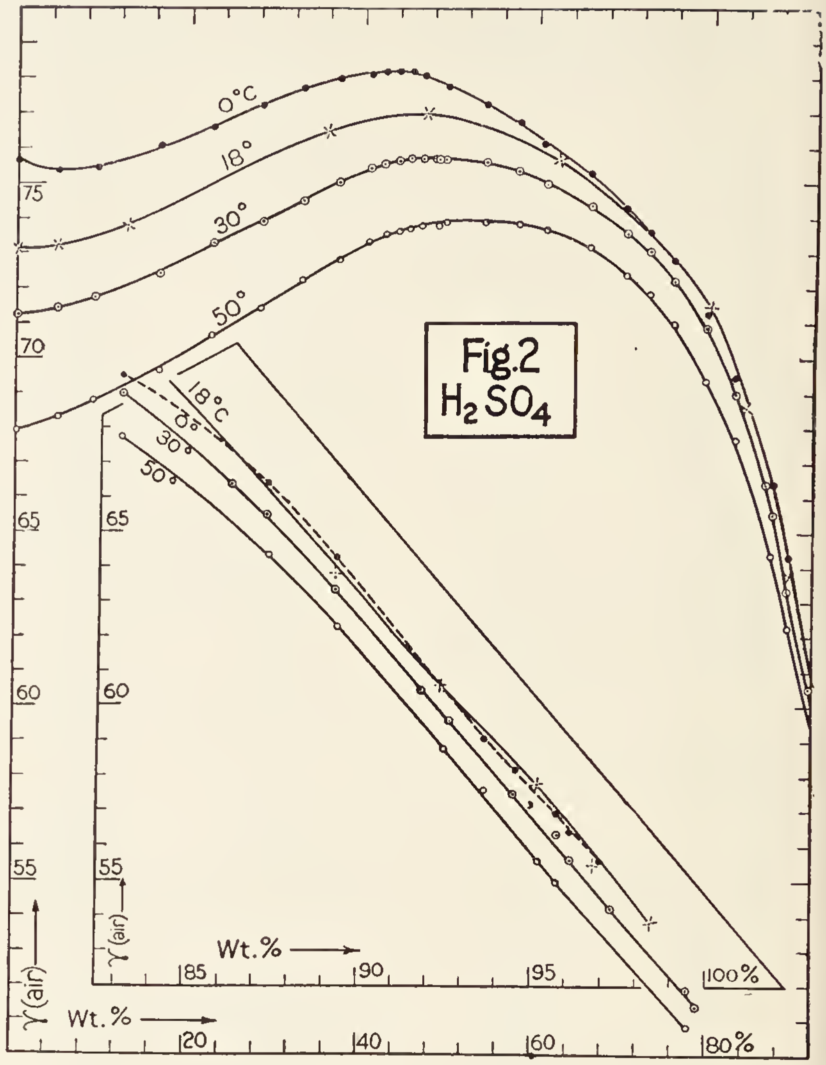
ThOH (10)

$ZnCl_2$, 12.5°C (IX) (54)

0.530	1.47±0.4

$ZnSO_4$ (I, III, IX) 10–30°C (12, 43, 54, 61)

0.25	0.5 ±0.05
0.5	0.98±0.1
1.0	1.96±0.15
2.0	4.3 ±0.2
2.4	5.3 ±0.2



$ZnSO_4$.—(*Continued*)

M	Δγ (air)
2.75	6.3 ±0.2
5.25	11.7 ±?

$Zn(NO_3)_2$, 21°C (IX) (54)

2.31	4.85±1.0
40°C (II) (41)	
0.6	1.5±*ca.* 0.3
1.1	3.0±*ca.* 0.5
2.8	7.8±*ca.* 1.0
4.2	11.5±*ca.* 1.5
5.2	13.7±*ca.* 1.5
6.3	15.3±*ca.* 2.0

$Zn(C_2H_3O_2)_2$, Acetate (38)

$CdCl_2$, 20°C (II) (13, 33)

0.5	0.9±0.1
1.0	1.7±0.2
2.5	4.1±0.3
4.0	6.4±0.3
5.8	8.8±0.4

$CdSO_4$, 15°C (I) (59)

0.355	0.96±0.5
0.710	1.37±0.5

$Hg(CN)_2$ (V, IX) (54, 55)

For 0.25 M, Δγ (air) from 15 to 20°C = −0.28 ± 0.15

$CuCl_2$ (54)

$CuSO_4$, 10–30°C (I, III, IX) (12, 43, 44, 54, 61)

M	Δγ (air)
0.2	0.37±0.05
0.5	0.92±0.1
1.0	1.83±0.1
1.2	2.20±0.1

$Cu(CHO_2)_2$, Formate (38)

$AgNO_3$ (II, III, IX) (13, 48, 54)

M	Δγ (air) 20°C	100°C
0.5	0.64±0.1	
1.0	1.23±0.2	1.3±0.2
2.0	2.31±0.3	
3.0	3.28±0.4	3.8±0.4
5.0	4.95±0.3	5.9±0.4
6.2	5.85±0.2	7.2±0.5

$MnCl_2$, 18°C (I, IX) (44, 54)

M	Δγ (air)
0.5	1.49±0.2
1.0	2.97±0.2
2.0	5.92±0.2
3.0	8.90±0.3
4.0	11.84±0.3
4.8	14.20±0.4

$MnSO_4$, 15–18°C (I, III, IX) (54, 59, 64)

0.5	1.05±0.3
1.0	2.1 ±0.5

$Mn(C_3H_5O_3)_2$, Lactate ([38])

$FeCl_3$, 15–20°C (I) ([44])

M	$\Delta\gamma$ (air)
3.30	6.6±0.5
5.24	12.0±0.5

$FeSO_4$, 20°C (III, IX) ([12, 54])

0.5	0.75±0.2
1.0	1.55±0.4
1.5	2.30±0.5

$Fe_2(C_2O_4)_3$, Oxalate ([38])

$CoSO_4$, 15°C (I) ([59])

0.355	0.79±0.3
0.713	1.56±0.3

$NiSO_4$, 15°C (I) ([59])

0.354	0.80±0.3
0.707	1.54±0.3

$Al_2(SO_4)_3$ (IX) ([54])

M = 0.561

t, °C	$\Delta\gamma$ (air)
20.5	1.91±0.4
16.25	1.86±0.4

$MgCl_2$ (I, IX) ([14, 25, 54, 61])

M	$\Delta\gamma$ (air)
20°C	
0.025	0.09±0.02
0.05	0.17±0.02
0.1	0.32±0.03
0.25	0.78±0.04
0.5	1.52±0.05
1.0	3.04±0.1
2.0	6.35±0.3
3.0	10.23±0.5
3.65	12.95±0.5
10 and 30°C	
1.0	3.04±0.2
2.0	6.35±0.3
3.0	10.23±0.5

$MgSO_4$ (I, II, III, IX) ([12, 25, 43, 54, 61]); *cf.* ([33])

10°C	
1.0	2.10±0.1
2.0	4.57±0.1
20°C	
0.025	0.08±0.03
0.05	0.15±0.05
0.1	0.26±0.06
0.25	0.53±0.05
0.5	1.03±0.05
1.0	2.10±0.1
2.0	4.57±0.1
2.7	6.52±0.2
30°C	
1.0	2.10±0.1
2.0	4.57±0.1
4.2	(8.1 ±3.0)

$Mg(CHO_2)_2$, Formate ([38])

$Mg(C_2H_3O_2)_2$, Acetate 25°C (I) ([50]); *cf.* ([54])

0.45	0.9±*ca.* 0.5
1.14	0.4±*ca.* 0.5
2.16	+0.1±*ca.* 0.5
3.22	−1.4±*ca.* 0.5
4.55	−2.3±*ca.* 0.5

$CaCl_2$ (I, II, IX) ([14, 16, 41, 54, 61])

M	$\Delta\gamma$ (air)
10°C	
0.5	1.52±0.2
1.0	3.2 ±0.3
2.0	6.9 ±0.4
3.0	11.0 ±0.3
4.0	14.95±0.2
25°C	
0.1	0.35±0.03
0.25	0.78±0.03
0.5	1.52±0.1
1.0	3.2 ±0.15
2.0	6.9 ±0.2
3.0	11.0 ±0.2
4.0	14.95±0.2
5.0	18.4 ±0.3
7.0	25.1 ±0.5
11.2	35 ±4.0

$CaSO_4$ ([55])

$Ca(CHO_2)_2$, Formate ([38, 59])

$Ca(C_2H_3O_2)_2$, Acetate ([38, 59])

$SrCl_2$ (I, IX) ([14, 25, 54, 61])

20°C	
0.025	0.10±0.02
0.05	0.18±0.02
0.1	0.35±0.03
0.25	0.82±0.05
0.5	1.62±0.1
1.0	3.25±0.1
1.5	5.00±0.15
2.0	6.76±0.2
2.6	8.87±0.2
10 and 30°C	
0.5	1.62±0.1
1.0	3.25±0.1
1.5	5.00±0.15

$Sr(NO_3)_2$ 23.7°C (IX) ([54])

0.561	1.27±0.4

$Sr(CHO_2)_2$, Formate ([38])

$Sr(C_2H_3O_2)_2$, Acetate (IX) ([54])

At 12.6°C, $\Delta\gamma$ (air) = 0.4 ± 0.3 for 0.561M

$Ba(OH)_2$ ([10])

$BaCl_2$ (I, II, IX) ([14, 25, 54, 61]); *cf.* ([33])

20°C	
0.05	0.19±0.05
0.1	0.33±0.05
0.25	0.78±0.05
0.5	1.51±0.1
1.0	2.97±0.2
1.7	5.02±0.3
10 and 30°C	
0.5	1.51±0.1
1.0	2.97±0.2
1.7	5.02±0.3

$Ba(NO_3)_2$, 20–50°C (II, IX) ([33, 54])

0.3	0.6±0.2
0.5	1.0±0.3

$Ba(CHO_2)_2$, Formate ([38, 59])

$Ba(C_2H_3O_2)_2$, Acetate ([59])

$Ba(C_5H_9O_2)_2$, Isovalerate ([56])

$LiOH$, 18°C (I) ([51]); *cf.* ([10])

M	$\Delta\gamma$ (air)
0.7	1.19±0.2
1.5	2.46±0.2

$LiCl$, 20°C (I, II) ([13, 20, 51])

0.5	0.81±0.03
1.0	1.63±0.05
1.5	2.43±0.10
2.0	3.26±0.1
4.0	6.70±0.2
8.0	13.53±0.2
13.0	20.77±0.3
19.4	28.01±0.4

$LiBr$, 18°C (I) ([51])

0.7	0.94±0.2
1.5	1.95±0.2

LiI, 18°C (I) ([51])

0.7	0.54±0.2
1.5	1.17±0.2

Li_2SO_4, 18°C (I) ([51])

0.7	1.82±0.2
1.5	4.04±0.2

$LiNO_3$, 18°C (I) ([51])

0.7	0.89±0.2
1.5	1.82±0.2

$LiCHO_2$ Formate ([38])

$NaOH$, 18°C (I) ([7, 51]); *cf.* ([10])

0.7	1.3±0.1
1.5	2.8±0.2
5.0	10.0±0.4
7.0	14.7±0.4
11.0	22.8±1.0
14.0	27.6±1.0

$NaCl$ (I, II, III, IX) ([12, 13, 14, 15, 19, 33, 51, 54, 61, 64])

0°C	
0.5	0.82 ±0.2
1.0	1.64 ±0.2
2.0	3.28 ±0.2
3.0	4.90 ±0.3
20°C	
0.025	0.055±0.02
0.05	0.09 ±0.02
0.1	0.17 ±0.02
0.25	0.42 ±0.03
0.5	0.82 ±0.05
1.0	1.64 ±0.05
2.0	3.28 ±0.1
3.0	4.90 ±0.1
4.0	6.54 ±0.15
5.0	8.17 ±0.2
6.0	9.80 ±0.2
10 and 30°C	
0.5	0.82 ±0.1
1.0	1.64 ±0.1
2.0	3.28 ±0.15
3.0	4.90 ±0.2
4.0	6.54 ±0.2
5.0	8.17 ±0.2
6.0	9.80 ±0.2

$NaClO_3$, 15°C (V, IX) ([54, 55])

M	$\Delta\gamma$ (air)
0.5	0.30±0.2
1.7	0.96±0.4

$NaBr$, 20°C (I, IX) ([51, 54])

0.5	0.65±0.2
1.0	1.30±0.2
1.5	1.97±0.2
2.9	3.80±0.4

NaI (I, II) ([33, 51])

0°C	
1.0	1.01±0.3
20°C	
0.7	0.70±0.1
1.0	1.01±0.2
1.5	1.52±0.2
30°C	
1.0	1.01±0.2

Na_2SO_4 (I, II, III, IX) ([12, 33, 43, 44, 51, 54, 61])

0°C	
0.5	1.36±0.4
10°C	
0.2	0.54±0.1
0.5	1.36±0.1
20°C	
0.2	0.54±0.1
0.5	1.36±0.1
1.0	2.73±0.1
30°C	
0.5	1.36±0.1
1.0	2.73±0.2

$Na_2S_2O_3$, 40°C (II) ([41])

0.49	1.5±*ca.* 25%
1.00	2.8±*ca.* 25%
3.04	9.3±*ca.* 25%
5.04	16.3±*ca.* 25%
8.34	23.9±*ca.* 25%
9.73	27.0±*ca.* 25%
11.18	28.8±*ca.* 25%

$NaHSO_4$, 13.4°C (IX) ([54])

0.561	1.67±0.4

$NaNO_3$, (I, II, III, IX) ([12, 33, 43, 51, 61])

0°C	
1.0	1.2 ±0.2
10°C	
0.25	0.30±0.05
0.5	0.60±0.05
1.0	1.20±0.1
2.0	2.37±0.2
3.0	3.50±0.2
4.0	4.60±0.4
5.0	5.63±0.6
6.0	6.60±0.6
20°C	
0.025	0.04±0.02
0.05	0.07±0.02
0.1	0.12±0.03
0.25	0.30±0.05
0.5	0.60±0.05

$NaNO_3$.—(*Continued*)

M	Δγ (air)
20 and 30°C	
1.0	1.20±0.1
2.0	2.37±0.2
3.0	3.50±0.2
4.0	4.6 ±0.4
5.0	5.63±0.6
6.0	6.6 ±0.6
7.0	7.5 ±0.6
10.0	9.9 ±0.6
12.2	11.3 ±0.6

Na_3PO_4, 16.5°C (III) (12)

0.28	0.83±0.3
0.34	0.96±0.3
0.42	1.20±0.3

Na_2HPO_4 (II, IX) (33, 54)
For 0.4 M, Δγ (air) from 18 to 30°C = 0.81 ± 0.2

Na_2HAsO_4 (IX) (54)

20.0°C	
0.28	0.64±0.4
21.9°C	
0.561	1.27±0.4

Na_2CO_3 (I, II, III)
(12, 43, 51, 61); *cf.* (10, 38)

10°C	
0.25	0.65±0.1
0.5	1.28±0.1
1.0	2.65±0.15
20°C	
0.25	0.65±0.1
0.5	1.28±0.1
1.0	2.65±0.15
1.5	4.0 ±0.2
30°C	
1.0	2.65±0.15

$NaHCO_3$ (II) (5)
For 0.5 M, γ (air) at 25°C = 1.0 ± 0.3

$NaCHO_2$, Formate (38, 59)

$NaC_2H_3O_2$, Acetate (38, 59)

$Na_2C_2O_4$, Oxalate (38)

$Na_2C_4H_4O_6$, Tartrate (38)

$NaC_4H_7O_2$, Butyrate (38)

$NaC_7H_5O_3$, Salicylate (38)

Na_2CrO_4, 30°C (II) (41)

M	Δγ (air)
0.51	1.4±*ca.* 25%
1.95	6.1±*ca.* 25%
3.31	11.4±*ca.* 25%
5.10	19.7±*ca.* 25%
6.12	25.3±*ca.* 25%
6.99	27.4±*ca.* 25%

KOH, 15–18°C (I) (51, 59); *cf.* (10)

0.5	0.89±0.2
1.0	1.78±0.2
1.5	2.67±0.2
2.0	3.53±0.3
3 8	6.7 ±0.5

KCl (I, II, III, IX)
(12, 13, 14, 15, 33, 51, 54, 61)

M	Δγ (air)
0°C	
1.0	1.4 ±0.3
20°C	
0.1	0.155±0.02
0.25	0.36 ±0.02
0.5	0.70 ±0.05
1.0	1.4 ±0.1
10, 20 and 30°C	
2.0	2.78 ±0.1
3.0	4.15 ±0.1
4.0	5.50 ±0.2
4.4	6.03 ±0.2

$KClO_3$ (V, IX) (54, 55)
For 0.56 M, Δγ (air) at 25°C = 0.25 ± 0.2

$KClO_4$ (55)

KBr (I, II, V, IX)
(33, 51, 54, 55)

20°C	
0.5	0.67±0.1
1.0	1.32±0.1
1.5	1.99±0.2
3.0	3.97±0.3
4.8	6.31±0.4
0 and 30°C	
1.0	1.32±0.2

KI (I, II, IX) (33, 51, 54)

20°C	
0.5	0.42±0.1
1.0	0.85±0.1
1.5	1.26±0.2
3.0	2.51±0.3
4.0	3.35±0.3
6.2	5.20±0.3
0 and 30°C	
1.0	0.85±0.2

K_2SO_4 (I, II, III, IX)
(12, 33, 43, 44, 51, 54, 61)

10 and 20°C	
0.25	0.63±0.1
0.5	1.29±0.1
0.7	1.79±0.1
30°C	
0.5	1.29±0.1

KNO_2, 20°C (III) (48)

36.02	22.25±*ca.* 0.5
30.07	18.95±*ca.* 0.5
22.61	15.25±*ca.* 0.5
17.67	12.25±*ca.* 0.5
11.75	8.95±*ca.* 0.5
8.002	6.75±*ca.* 0.5
5.036	4.65±*ca.* 0.5
2.938	3.25±*ca.* 0.5

KNO_3, 10–30°C (I, III, IX)
(12, 15, 25, 43, 51, 54, 61)

0.02	0.03±0.02
0.1	0.11±0.03
0.25	0.26±0.04
0.5	0.51±0.05
1.0	1.03±0.1
1.5	1.55±0.1

KNO_3.—(*Continued*)

M	Δγ (air)
2.0	2.05±0.1
2.5	2.50±0.2
3.9	3.70±0.3

K_3PO_4 (33)

KH_2PO_4 (33)

K_2CO_3 (I, II, III)
(12, 38, 43, 48, 51, 61)

0°C	
0.25	0.7 ±0.4
10°C	
0.75	2.20±0.3
1.00	2.98±0.3
1.50	4.6 ±0.3
2.00	6.3 ±0.3
2.50	8.1 ±0.7
3.00	10.1 ±0.7
4.00	14.4 ±0.7
5.00	19.1 ±1.0
6.00	24.2 ±1.0
7.50	34.0 ±1.5
20°C	
0.50	1.46±0.2
0.75	2.20±0.2
1.00	2.98±0.2
1.50	4.58±0.2
2.00	6.32±0.3
2.50	8.14±0.4
3.00	10.1 ±0.5
4.00	14.4 ±0.6
5.00	19.1 ±0.6
6.00	24.2 ±1.0
7.00	29.8 ±1.5
7.50	32.6 ±1.5
8.30	38.0 ±2.0
30°C*	
0.75	2.20±0.3
1.00	2.98±0.3
1.50	4.6 ±0.4
2.00	6.3 ±0.8
2.50	8.1 ±1.0

K_2CO_3.—(*Continued*)

M	Δγ (air)
30°C*	
3.00	10.1 ±1.0
4.00	14.4 ±1.0
5.00	19.1 ±1.0
6.00	24.2 ±1.0
7.00	28.8 ±1.5
8.30	36.0 ±2.0

* Δγ of Reybinder (48) is 0.4 to 0.8 dyne/cm higher at 30 than at 10°C for solutions more dilute than 4.0 M. The differences are of the opposite sign and much larger for the more concentrated solutions.

$KCHO_2$, Formate (38)

$KC_2H_3O_2$, Acetate (IX) (54); *cf.* (38)
For 0.56 M, Δγ (air) at 13.3° = 0.25 ± 0.4

$K_2C_4H_4O_6$, Tartrate (38)

$K_3C_6H_5O_7$, Citrate (38)

KCN, 15.3°C (IX) (54)

M	Δγ (air)
2.313	2.11±0.4

$KMnO_4$ (54)

$K_4Fe(CN)_6$, 0–30°C (II, IX)
(33, 54)

0.25	0.85±0.2
0.55	1.87±0.3

$K_3Fe(CN)_6$ (IX) (54)

M	Δγ (air)	*t*, °C
0.280	0.98±0.4	12.35
0.561	0.86±0.4	13.5
0.561	2.11±0.4	19.8
0.561	1.86±0.4	20.8

K_2CrO_4, 10–15°C (I) (54, 59)

M	Δγ (air)
1.0	2.6±0.5
2.3	6.0±0.7

$K_2Cr_2O_7$, 16°C (IX) (54)

0.28	0.78±0.4

C-Table, C-Arrangement (*v.* Vol. III, p. viii)

The surface tensions of aqueous solutions of organic acids and of the higher alcohols as determined by various workers are not in good agreement. The disagreements between values determined by the same method are on the whole as great as when different methods are used. This may be due to the presence of small amounts of impurities, incorrect use of methods of measurement, and in some cases to the formation of semisolid films at the surface.

CH_2O_2, Formic acid; 30°C (II) (39)

Wt. %	γ (air) ±0.5	Wt. %	γ (air) ±0.5
1.00	70.07	40.00	51.97
2.50	68.38	50.00	49.50
5.00	66.20	60.00	47.16
10.00	62.78	70.00	44.67
15.00	60.08	75.00	43.40
20.00	57.92	80.01	42.09
25.00	56.29	90.00	39.34
30.01	54.76	100.00	36.51

15°C (I) (60)

M/l_s	γ (air) ±0.5
1.0	68.88
0.5	70.60
0.25	71.96
0.125	72.51

25 and 35°C (I) (8)

CH_4N_2O, Urea
15°C (I) ([59])

g/l_s	γ (air)
100	1.1±0.5
200	1.2±0.5

CH_4O, Methyl alcohol
30°C (II) ([39])

Wt. %	γ (air) ±0.2
1.011	68.44
2.500	65.32
4.997	60.98
9.994	54.60
15.00	49.89
20.00	46.05
25.00	43.00
29.98	40.27
39.98	36.09
50.00	32.92
60.00	30.38
70.00	28.15
75.00	27.08
80.03	26.03
90.01	23.90
100.00	21.76

γ (air) 15°C (I) ([59]) *cf.* ([60])

CH_5NO_2, Ammonium formate ([38])

$C_2HCl_3O_2$, Trichloroacetic acid (I) ([8])

Wt. %	γ (air) ±*ca.* 2.0	
	25°C	35°C
3.20	66.84	65.14
3.81	65.90	63.95
8.56	57.33	55.50
15.56	48.97	46.90
40.16	40.04	39.16
71.15	37.67	36.55
86.84	36.30	35.50

$C_2H_2Cl_2O_2$, Dichloroacetic acid (I) ([8])

Wt. %	γ (air) ±*ca.* 2	
	25°C	35°C
3.17	61.72	61.20
6.60	54.74	54.09
13.03	44.36	44.02
47.93	40.48	40.14
98.42	36.87	35.35

$C_2H_2O_4$, Oxalic acid
20°C (II) ([24]); *cf.* ([38, 60])

M	γ (air) ±*ca.* 0.5
1.000	71.86
0.500	72.07
0.250	72.23
0.125	72.41
0.0625	72.52

$C_2H_2O_4$.—(*Cont'd*)

M	γ (air) ±*ca.* 0.5
0.0313	72.61
0.0156	72.69
0.00781	72.71
0.00390	72.72

$C_2H_3BrO_2$, Bromoacetic acid; a^2 (air) 22°C (I) ([58])

$C_2H_3ClO_2$, Chloroacetic acid (I) ([8])

Wt. %	γ (air) ±*ca.* 2.0	
	25°C	35°C
3.35	66.40	65.00
7.70	61.22	60.00
10.09	58.91	57.89
31.54	50.34	49.44
49.97	47.68	46.69
60.01	46.81	45.43
72.11	45.09	43.95

C_2H_4O, Acetaldehyde
22°C (I) ([58])

M/l_s	a^2 (air) ±2%
4.54	0.09471
2.27	0.1111
1.14	0.1240
0.568	0.1339
0.284	0.1405

$C_2H_4O_2$, Acetic acid
30°C (II) ([39])

Wt. %	γ (air) ±0.5
0.000	71.23
1.000	67.98
2.475	64.42
5.001	60.11
10.01	54.56
14.98	50.53
20.09	47.72
30.09	43.60
40.11	40.68
49.96	38.38
60.05	36.25
69.91	34.26
79.88	32.12
100.00	26.58

15°C (I) ([60])

M/l_s	γ (air) ±0.5
1	60.90
0.5	65.06
0.25	68.64
0.125	70.78
0.0625	71.99

$C_2H_4O_2$.—(*Cont'd*)
(I) ([8])

Wt. %	γ (air) ±2	
	25°C	35°C
2.17	65.32	64.16
5.94	59.06	58.03
10.99	52.79	52.12
19.25	47.89	47.05
41.49	40.19	39.23
51.84	37.81	37.04
65.25	35.15	34.16
83.08	31.11	30.28
91.37	28.88	28.03
93.53	27.87	26.90

$C_2H_4O_2$, Methyl formate
22°C (I) ([58])

M/l_s	a^2 (air) ±2%
2.627	0.07413
1.313	0.1033
0.657	0.1217
0.328	0.1330
0.164	0.1409
0.082	0.1458

C_2H_5NO, Acetamide
15°C (I) ([60])

M/l_s	γ (air) ±2%
1.0	69.79
0.5	71.60
0.25	72.59
0.125	73.04

C_2H_6O, Ethyl alcohol
15°C (I) ([59]); *cf.* ([60])

Wt. %	γ (air) ±0.4
1.96	64.60
3.85	58.37
9.09	49.96
16.7	41.74
33.3	32.39
44.4	29.68
100.0	22.88

25°C (II) ([2])

Wt. %	γ (air) ±0.3
0.00	72.20
2.72	60.79
5.21	54.87
11.10	46.03
20.50	37.53
30.47	32.25
40.00	29.63
50.22	27.89
59.58	26.71
68.94	25.71
77.98	24.73
87.92	23.64
92.10	23.18
97.00	22.49
100.00	22.03

C_2H_6O.—(*Cont'd*)
30°C (II) ([39])

Wt. %	γ (air) ±0.2
0.000	71.23
0.979	66.08
2.143	61.56
4.994	54.15
10.385	45.88
17.979	38.54
25.00	34.08
29.98	31.89
34.89	30.32
50.00	27.45
60.04	26.24
71.85	25.05
75.06	24.68
84.57	23.61
95.57	22.09
100.00	21.47

$C_2H_6O_2$, Glycol
15°C (I) ([60])

M/l_s	γ (air) ±2%
1.0	70.94
0.5	72.36
0.25	73.02
0.125	73.27

$C_2H_7NO_2$, Ammonium acetate ([38])

$C_2H_8N_2O_4$, Ammonium oxalate ([38])

$C_3H_4O_4$, Malonic acid; γ (air) 15°C (I) ([60]); 20°C (II) ([24])

C_3H_6O, Allyl alcohol
15°C (I) ([60])

M/l_s	γ (air) ±2%
1.0	51.49
0.5	59.08
0.25	64.94
0.125	68.73
0.0625	70.85
0.03125	72.29

C_3H_6O, Propionaldehyde; a^2 (air) 22°C (I) ([58])

C_3H_6O, Acetone
(II) ([40])

Wt. %	γ (air) ±0.2		
	0°C	25°C	45°C
0	75.76	71.95	68.69
5	59.54	55.45	52.52
10	53.24	48.94	45.87
20	45.21	41.11	38.14
25	42.33	38.25	35.24
30	40.01	35.98	33.18
40	36.20	32.69	30.06
50	33.53	30.38	27.86
75	29.59	26.75	24.46
85	28.52	25.59	23.28
90	27.96	25.02	22.64
95	27.24	24.19	21.71
100	26 13	23.04	20.55

C_3H_6O.—(*Cont'd*)
15°C (I) ([60])

M/l_s	γ (air) ±*ca.* 0.5
0.0313	71.73
0.0625	70.43
0.125	68.49
0.25	65.31
0.5	61.06
1.0	55.62

$C_3H_6O_2$, Ethyl formate
22°C (I) ([58])

M/l_s	a^2 (air) ±2%
0.675	0.09948
0.338	0.1136
0.169	0.1298
0.084	0.1379

$C_3H_6O_2$, Methyl acetate
15°C (I) ([60])

M/l_s	γ (air) ±2%
1.0	47.47
0.5	55.56
0.25	61.68
0.125	66.09
0.0625	69.20
0.03125	71.06

$C_3H_6O_2$, Propionic acid
15°C (I) ([60])

M/l_s	γ (air) ±2.0
1.0	48.60
0.5	55.56
0.25	61.80
0.125	66.21
0.0625	69.35
0.03125	71.24
0.015625	72.40

(I, III) ([47])

M/l_s	γ (air) ±3.0		
	0°C	10°C	20°C
0.0	75.90	74.20	72.70
0.100	68.25		65.50
0.238	62.50	61.28	60.00
0.952	49.22	47.79	46.66
2.000	41.00		38.75
3.806	35.00	34.53	34.06
	40°C	60°C	80°C
0.0	69.45	66.10	62.82
0.100	63.25		58.50
0.238	58.19	56.05	54.26
0.952	45.00	43.65	42.46
2.000	37.70		35.70
3.806	33.10	31.86	30.90
	100°C		
0.0	59.60	0.952	41.51
0.238	52.51	3.806	30.05

$C_3H_6O_2$.—(*Cont'd*)
(I) ([8])

Wt. %	γ (air) ±*ca.* 2.0	
	25°C	35°C
0.988	64.46	63.31
1.914	59.78	58.74
5.84	49.05	48.45
9.82	43.86	43.03
21.71	36.37	35.71
49.80	31.69	31.06
73.92	29.67	28.95
99.99	25.64	24.72

20°C (II) ([18])

M	γ (air) ±*ca.* 2.0
0.0157	72.80
0.0317	72.70
0.0528	70.76
0.126	66.98
0.254	64.01
0.518	55.62
1.080	48.52
2.55	41.21
5.50	35.54

C_3H_7N, Allylamine
γ (air) 15°C (I) ([60])

C_3H_8O, Propyl alcohol
15°C (I) ([60])

M/l_s	γ (air) ±0.4
0.0313	70.76
0.0625	68.64
0.125	65.08
0.25	59.34
0.5	51.94
1.0	43.59

C_3H_8O, Isopropyl alcohol
15°C (I) ([60])

M/l_s	γ (air) ±2%
1.0	46.58
0.5	53.66
0.25	60.37
0.125	65.21
0.0625	68.56
0.0313	70.77

$C_3H_8O_3$, Glycerol
15–18°C (I) ([9, 59])

Wt. %	Δγ (air)
5	−0.15±0.5
10	−0.2 ±0.5
15	−0.4 ±0.5
20	−0.65±0.7
30	−1.4 ±1.0
50	−3.2 ±2.0
85	−7.3 ±2.5
98	−9.3 ±3 0
100	−9.7 ±3 0

C_3H_9N, Propylamine
15°C (I) (60)

M/l$_s$	γ (air) ±2%
1 0	46.68
0.5	53.03
0.25	59.55
0.125	64.09
0.0625	68.43
0.03125	70.39

$C_4H_4O_4$, Fumaric acid
20°C (II) (24)

M	γ (air) ±*ca.* 0.5
0.0500	72.01
0.0250	72.31
0.0125	72.51
0.00625	72.59
15°C (I) (60)	
0.0313	73.19

$C_4H_4O_4$, Maleic acid
20°C (II) (24)

M	γ (air) ±*ca.* 1.0
0.935	66.80
0.468	69.06
0.234	70.48
0.117	71.41
0.0584	72.03
0.0292	72.35
0.0146	72.56

γ (air) 15°C (I) (60)

$C_4H_6O_4$, Succinic acid
20°C (II) (24)

M	γ (air) ±*ca.* 2.0
0.500	68.05
0.250	69.70
0.125	70.95
0.0625	71.74
0.0313	72.21
0.0156	72.39
0.00781	72.50

γ (air) 15°C (I) (60)

$C_4H_6O_4$, Dimethyl oxalate
γ (air) 15°C (I) (60)

$C_4H_6O_5$, Malic acid
20°C (II) (24)

M	γ (air) ±*ca.* 2.0
0.774	67.08
0.387	69.26
0.193	70.67
0.0967	71.53
0.0483	72.10
0.0239	72.40
0.0115	72.61

γ (air) 15°C (I) (60)

$C_4H_6O_6$, *d*-Tartaric acid
20°C (II) (24); *cf.* (38, 59, 60)

M	γ (air) ±*ca.* 1.0
8.00	74.13
4.00	73.26
2.00	72.90
1.00	72.70
0.500	72.68
0.250	72.64
0.125	72.66

$C_4H_6O_6$, *dl*-Tartaric acid (59)

$C_4H_7NO_4$, Aspartic acid (60)

C_4H_8O, *n*-Butyraldehyde; γ (air) 15°C (I) (60)

$C_4H_8O_2$, *n*-Butyric acid (I) (56)

M/l$_s$	γ (air) ±*ca.* 2.0
2°C	
0.000	75.39
0.091	61.48
0.182	54.87
0.364	47.29
0.748	38.88
18°C	
0.0000	73.10
0.0242	68.72
0.0363	66.57
0.0545	64.06
0.0817	60.84
0.122	57.25
0.184	53.07
0.276	48.74
0.414	44.09
0.621	39.26
0.931	34.53
25°C	
0.0000	72.01
0.0275	66.48
0.0550	62.59
0.1098	57.23
0.2193	50.60
0.4385	43.00
0.877	34.79
15°C (I) (60)	
0.00781	71.85
0.0156	70.48
0.0313	67.60
0.0625	63.25
0.125	56.58
0.25	49.27
0.5	41.15
1.0	33.34

$C_4H_8O_2$.—(*Cont'd*)
(I, III) (47)

M/l$_s$	γ (air) ±*ca.* 2.0 0°C	10°C	20°C
0.007	73.65	72.53	71.25
0.021	70.95	69.51	68.12
0.050	65.50	64.30	63.53
0.104	62.00	59.85	58.60
0.246	52.18	51.09	50.30
0.489	45.91	44.00	42.57
1.006	35.87	34.81	33.78
11.04	28.22		26.61
	40°C	60°C	80°C
0.007	68.40	65.31	62.21
0.021	65.80	63.45	60.50
0.050	62.21	60.42	58.17
0.104	56.81	55.22	53.86
0.246	48.81	47.48	46.59
0.489	40.92	39.98	39.50
1.006	32.48	31.41	31.12
11.04		23.21	21.45

100°C

M/l$_s$	γ (air)	M/l$_s$	γ (air)
0.007	59.00	0.246	46.05
0.021	57.38	0.489	39.21
0.050	55.50	1.006	31.00
0.104	52.34	11.04	19.70

(I) (8)

Wt. %	γ (air) ±*ca.* 2.0 25°C	35°C
0.14	69.36	67.96
0.31	64.82	63.81
0.73	59.63	58.38
1 05	56.03	55.07
3.83	41.56	40.85
8.63	32.84	32.19
24.96	28.02	27.47
79.38	26.94	26.69
100.2	26.00	25.14

20°C (II) (18)

M	γ (air) ±*ca.* 2.0
0.0066	72.29
0.013	71.22
0.024	68.72
0.050	64.69
0.101	58.63
0.159	54.04
0.322	46.17
0.663	38.31
1.409	30.95
3.22	28.65
11.0	28.29
117.0	27.40

$C_4H_8O_2$, Isobutyric acid (I) (8)
For two-layer systems, *v.* (64)

Wt. %	γ (air) ±*ca.* 1.0 25°C	35°C
0.10	69.64	68.03
0.43	62.59	61.48
0.76	58.41	57.54
1.92	49.62	48.81
5.65	37.31	36.48
11.69	29.82	29.23

$C_4H_8O_2$.—(*Cont'd*)

Wt. %	γ (air) ±*ca.* 1.0 25°C	35°C
18.95	27.30	27.04
69.93	26.50	25.78
101.1	24.49	23.38

15°C (I) (60)

M/l$_s$	γ (air) ±*ca.* 1.0
0.00781	71.85
0.0156	70.17
0.0313	67.05
0.0625	62.21
0.125	55.83
0.25	48.64
0.5	40.74
1.0	32.79
18°C (I) (56)	
0.0000	73.10
0.0187	68.76
0.0250	67.44
0.0375	65.11
0.050	63.39
0.075	60.07
0.100	57.81
0.125	55.66
0.150	53.69
0.200	50.99
0.250	48.37
0.30	46.48
0.40	43.45
0.50	40.83
0.60	38.47
0.80	35.12
1.00	32.77
1.20	31.07
25°C	
0.0250	66.91
0.0370	64.67
0.0555	62.01
0.0833	58.82
0.125	55.19
0.187	51.02
0.281	46.71
0.422	41.98
0.633	37.27
0.949	32.61
2°C	
0.0296	68.69
0.0592	63.95
0.1185	58.08
0.2375	51.10
0.475	42.74
0.950	35.61

$C_4H_8O_2$, Ethyl acetate
15°C (I) (60)

M/l$_s$	γ (air) ±2%
0.5	42.63
0.25	51.09
0.125	57.77
0.0625	63.29
0.03125	66.94

$C_4H_8O_2$.—(*Cont'd*)

M/l$_s$	γ (air) ±2%
0.0156	69.90
0.0078	71.54

$C_4H_8O_2$, Methyl propionate
15°C (I) (60)

0.5	41.61
0.25	51.28
0.125	58.39
0.0625	63.87
0.03125	67.75
0.0156	70.29
0.0078	71.72

$C_4H_8O_2$, Propyl formate
15°C (I) (60)

0.25	48.58
0.125	58.92
0.0625	64.23
0.03125	68.25
0.0156	70.25
0.0078	71.68

$C_4H_8O_3$, Hydroxyisobutyric acid
15°C (I) (60)

0.5	60.87
0.25	65.06
0.125	68.45
0.0625	70.59
0.03125	72.08

$C_4H_{10}O$, *n*-Butyl alcohol
20°C (II) (18)

M	γ (air) ±*ca.* 1.0
0.00329	72.80
0.00658	72.36
0.0132	71.26
0.0264	67.17
0.0536	63.14
0.105	56.03
0.211	48.08
0.433	40.38
0.854	28.57

$C_4H_{10}O$, Isobutyl alcohol
15°C (I) (59)

Wt. %	γ (air) ±*ca.* 1.0
0.249	65.60
0.99	52.99
1.96	45.35
2.91	40.33
4.76	34 04
7.41	27.97
100	22.91

15°C (I) (60)

M/l$_s$	γ (air) ±*ca.* 1.0
0.0156	69.25
0.0313	66.30
0.0625	60.52
0.125	54.25

$C_4H_{10}O$.—(*Cont'd*)

M/l$_s$	γ (air) ±*ca.* 1.0
0.25	45.29
0.5	36.31
1.0	27.21

(I) (65)

Wt. %	*t*, °C	γ (air) ±*ca.* 1.0
7.49	15	28.00
	44	24.37
	76	20.76
4.64	16	33.66
	46	30.14
	65	28.01
2.37	14	41.87
	50	37.13
	80	33.53
1.20	14	53.64
	46	49.55
	78	45.34

$C_4H_{10}O$, *tert.*-Butyl alcohol
22°C (I) (58)

M/l$_s$	a^2 (air) ±2%
0.337	0.09859
0.169	0.1120
0.084	0.1218

$C_4H_{12}ClN$, Tetramethylammonium chloride
0°C (I, III) (47)

M	Δγ (air) ±*ca.* 0.5
0.50	0.42
1.00	0.65
2.00	1.60

$C_5H_8O_2$, Allyl acetate; γ (air) 15°C (I) (60)

$C_5H_{10}O_2$, *n*-Valeric acid (I) (8)

Wt. %	γ (air) ±3.0 25°C	35°C
0.11	64.96	63.81
0.22	58.70	57.40
0.38	53.51	52.05
0.83	41.99	41.34
2.34	32.12	31.41
3.17	30.68	29.86
87.04	25.42	24.09
98.91	26.50	25.57

(III) (47)

M/l$_s$	γ (air) ±*ca.* 2 0°C	20°C	40°C
0.0103	67.03	65.45	63.77
0.0206	60.55	59.78	58.20
0.0683	52.10	49.31	48.35
0.2049	37.55	35.20	33.85
	60°C	80°C	90°C
0.0103	61.94	60.36	59.54
0.0206	57.14	56.33	55.99
0.0683	48.11	48.02	48.00
0 2049	33.42	33.37	

$C_5H_{10}O_2$.—(*Cont'd*) 17.5°C (I) (56)

M/l_s	γ (air) ±2
0.0093	68.04
0.0140	65.56
0.0210	62.31
0 0315	58.65
0.0475	54.15
0.071	49.80
0.107	44.89
0.160	39.86
0.240	34.70

$C_5H_{10}O_2$, Isovaleric acid (I) (8)

Wt. %	γ (air) ±*ca.* 2.0 25°C	35°C
0.15	63.74	62.82
0.34	56.90	56.27
1.03	45.30	44.02
2.54	34.57	33.66
4.24	29.17	28.38
89.37	24.56	23.52
99.77	24.92	24.16

19°C (I) (56)

M/l_s	γ (air) ±*ca.* 2.0
0.00425	70.53
0.0085	68.05
0.0128	65.79
0.0170	63.97
0.0212	62.22
0.0256	60.62
0.034	58.07
0.0425	56.03
0.051	54.06
0.068	51.14
0.085	48.66
0.102	46.69
0.170	40.78
0.204	38.53

15°C (I) (60)

M/l_s	γ (air) ±2%
0.25	35.93
0.125	44.28
0.0625	52.10
0.0312	59.11
0.0156	65.03
0.00781	67.78
0.00391	71.34

$C_5H_{10}O_2$, Isobutyl formate; a^2 (air) 22°C (I) (58)

$C_5H_{10}O_2$, Ethyl propionate 15°C (I) (60)

M/l_s	γ (air) ±2%
0.125	46.79
0.0625	54.68
0.03125	60.53

$C_5H_{10}O_2$.—(*Cont'd*)

M/l_s	γ (air) ±2%
0.0156	65.18
0.0078	68.69
0.0039	70.88

$C_5H_{10}O_2$, Methyl butyrate 22°C (I) (58)

M/l_s	a^2 (air) ±2%
0.123	0.09177
0.0612	0.1120
0.0306	0.1249
0.0153	0.1354

$C_5H_{10}O_2$, Propyl acetate 15°C (I) (60)

M/l_s	γ (air) ±2%
0.125	44.78
0.0625	52.73
0.03125	59.33
0.0156	64.27
0.0078	68.20
0.0039	70.56

$C_5H_{12}O$, Isoamyl alcohol 30°C (II) (39) For two-layer systems, *v.* (36)

Wt. %	γ (air) ±*ca.* 1.0
0.250	54.70
0.50	47.34
0.75	42.51
1.00	38.88
1.50	33.62
2.00	29.66
2.50	26.60

15°C (I) (59); *cf.* (60, 68)

Wt. %	γ (air) ±*ca.* 1.0
0.249	57.02
0.5	49.30
0.99	41.07
1.48	36.03
1.96	32.31
100.0	22.99

$C_5H_{12}O$, *tert.*-Amyl alcohol 15°C (I) (60)

M/l_s	γ (air) ±2%
0.5	36.57
0.25	43.86
0.125	50.55
0.0625	56.91
0.03125	62.24
0.0156	66.63
0.0078	69.54
0.0039	71.41

C_6H_6O, Phenol 20°C (I, II) (17, 35, 65) For saturated solutions, *v.* (13, 36, 64); for other temps., *v.* (65)

Wt. %	γ (air)
0.00	(72.8)
0.024	72.6±0.2
0.047	72.2±0.2
0.094	71.7±0.2
0.118	71.3±0.2
0.236	69.9±0.3
0.471	66.5±0.3
0.706	64.9±0.3
0.941	61.1±0.3
1.412	57.0±0.3
1.881	54.0±0.3
2.350	51.3±0.4
2.819	49.1±0.4
3.755	46.0±0.4
4.692	43.8±0.5
5.623	42.3±0.5

$C_6H_6O_2$, Pyrocatechol 20°C (II) (17)

M/l_s	γ (H_2) ±*ca.* 2.0
0.03	72.08
0.05	71.66
0.10	69.72
0.20	66.83
0.30	66.44
0.40	62.42
0.50	60.78
0.60	59.67
0.75	57.75
1.0	55.74
2.0	51.56

$C_6H_6O_2$, Resorcinol 20°C (II) (17)

0.03	72.12
0.05	71.39
0.10	70.62
0.15	69.62
0.20	68.84
0.30	67.74
0.40	66.80
0.50	66.24
0.60	65.44
0.75	64.36
1.0	63.41
1.5	61.14
2.0	60.46
3.0	58.63
4.0	58.16
5.0	57.57
6.0	57.06

$C_6H_6O_2$, Hydroquinol 20°C (II) (17)

0.05	72.27
0.10	71.63
0.20	70.71

$C_6H_6O_2$.—(*Cont'd*)

M/l_s	γ (H_2) ±*ca.* 2.0
0.30	70.19
0.35	69.65
0.45	69.51
0.50	69.05

$C_6H_6O_3$, Pyrogallol 20°C (II) (17)

0.1	71.71
0.2	70.38
0.3	68.24
0.5	65.74
0.6	64.87
0.75	62.37
1.00	60.00
1.50	56.10
2.00	53.80

C_6H_7N, Aniline (65)‡‡; for two-layer systems, *v.* (64)

$C_6H_8O_7$, Citric acid (38, 59)

$C_6H_{12}O_2$, *n*-Caproic acid 19°C (I) (56)

M/l_s	γ (air) ±*ca.* 2.0
0.00212	69.95
0.00425	66.59
0.0064	63.17
0.0085	60.25
0.0128	55.58
0.0170	51.89
0.0212	49.16
0.0256	46.90
0.0340	42.89
0.0425	39.90
0.051	37.35
0.068	34.14
0.085	30.89

(III) (47)

M/l_s	γ (air) ±*ca.* 2.0 0°C	10°C	20°C
0.0010	74.00	72.75	71.20
0.0050	65.83		63.69
0.0100	60.05	58.68	57.50
0.0200	53.00	51.10	49.59
0.0250	50.35	48.05	46.38
0.0300	47.96	45.15	43.25
0.0350	45.95	43.00	41.00
	40°C	60°C	80°C
0.0010	68.39	65.42	62.48
0.0050	62.21	60.83	59.61
0.0100	56.00	55.18	55.00
0.0200	47.55	46.50	46.00
0.0250	44.03	43.00	42.78
0.0300	41.14	40.10	40.00
0.0350	38.88	38.10	37.70
	90°C		
0.0010	60.90		

$C_6H_{12}O_2$, Isocaproic acid 18°C (I) (56)

M/l_s	γ (air) ±*ca.* 2.0
0.0016	70.87
0.0024	69.52
0.0036	67.36
0.0054	64.15
0.0081	60.23
0.0122	55.88
0.0183	50.95
0.0274	46.02
0.0411	41.16
0.0616	35.89
0.0924	30.67

$C_6H_{12}O_2$, Isoamyl formate 22°C (I) (58)

M/l_s	a^2 (air) ±2%
0.0269	0.1002
0.0135	0.1168

$C_6H_{12}O_2$, Isobutyl acetate 22°C (I) (58)

0.0269	0.1060
0.0135	0.1177

$C_6H_{12}O_2$, Ethyl butyrate 22°C (I) (58)

0.0269	0.1078
0.0135	0.1200

$C_6H_{12}O_2$, Propyl propionate 15°C (I) (60)

M/l_s	γ (air) ±2%
0.03125	54.45
0.0156	57.32
0.0078	62.85
0.0039	67.04
0.00195	69.99
0.000977	71.68

$C_6H_{12}O_3$, Paraldehyde 15°C (I) (60)

0.5	43.18
0.25	51.47
0.125	58.44
0.0625	63.78
0.03125	67.64
0.0156	70.17

$C_6H_{14}O_6$, Mannitol 15°C (I) (59)

g/l_s	Δγ (air)
50	0.4±0.2
100	0.8±0.4

$C_6H_{15}N$, Triethylamine (35, 36) For two layer system, *v.* (36)

$C_6H_{15}N$, Dipropylamine; 20°C (II) (18)

M/l_s	γ (air) ±*ca.* 2.0
0.5657	30.06
0.2828	38.13
0.1414	46.79
0.0707	53.40
0.03535	59.45
0.01767	65.66
0.008835	69.88
0.004417	71.03
0.0022085	72.80

$C_7H_6O_3$, Salicylic acid; γ (air) (I) 14.5°C (68)

C_7H_9N, *p*-Toluidine; γ (air) (I) 16°C (68)

$C_7H_9NO_3$, Ammonium salicylate (38)

$C_7H_{12}O_4$, Diethyl malonate; 20°C (II) (24)

M	γ (air) ±*ca.* 2.0
0.134	43.69
0.0677	51.12
0.0339	56.71
0.0169	61.25
0.00846	64.83
0.00423	67.70
0.00212	69.75
0.00106	70.97
0.000528	71.71
0.000264	72.12
0.000132	72.40
0.0000659	72.45

For γ (air) (I) 17°C, *v.* (68).

$C_7H_{14}O_2$, Heptylic acid (III) (47)

M/l_s	γ (air) ±*ca.* 2.0 0°C	10°C	20°C
0.0010	68.20	67.60	67.00
0.0038	54.81	54.25	53.84
0.0119	42.5	41.08	40.25
	40°C	60°C	80°C
0.0010	65.45	63.30	61.12
0.0038	53.73	53.50	53.00
0.0119	39.50	39.00	38.90

Continued on p. 470

$C_6H_{12}O_6$, Dextrose; for levulose, *v.* (5)

Wt. %	*t*, °C	Δγ (air)	Method	Lit.
1.0	25	0.25±0.2	(II)	(5)
8.8	15	0.8 ±0.4	(I)	(59)
17.1	15	1.4 ±0.4	(I)	(59)

$C_7H_{14}O_2$.—(*Cont'd*)
20°C (II) (18)

M	γ (air) ±*ca.* 2.0
0.000117	72.80
0.000235	72.37
0.000469	69.45
0.000938	65.46
0.00188	59.35
0.00376	53.36
0.00753	44.87
0.0151	35.75

$C_8H_6O_3$, Piperonal; γ (air) (I) 17°C (68)

$C_8H_8O_3$, Methyl salicylate; γ (air) (I) 16°C (68)

$C_8H_{12}O_4$, Diethyl fumarate; γ (air) 20°C (II) (24)

$C_8H_{14}O_4$, Diethyl succinate; γ (air) 20°C (II) (24)
For γ (air) (I) 18°C, *v.* (68).

$C_8H_{14}O_6$, Diethyl *d*-tartrate; γ (air) 20°C (II) (24)

$C_8H_{18}O$, Octyl alcohol
20°C (II) (18)

M/g H_2O	γ (air) ±*ca.* 2.0
Satd.	37.47
2.5	41.79
1.25	50.48
0.625	58.64
0.3125	67.07
0.2347	69.00
0.15675	71.81
0.078375	72.80

$C_8H_{20}ClN$, Tetraethylammonium chloride
0°C (I, III) (47)

M	Δγ (air) ±*ca.* 0.5
0.50	−0.82
1.00	−1.60

$C_9H_9NO_3$, Hippuric acid; γ (air) (I) 16.5°C (68)

$C_9H_{11}NO$, *p*-Acetotoluide; γ (air) (I) 16.5°C (68)

$C_9H_{18}O_2$, Pelargonic acid; γ (air) 20°C (II) (18)

$C_{10}H_{13}NO_2$, Phenacetin; γ (air) (I) 16°C (68)

$C_{10}H_{14}O$, Thymol; γ (air) (I) 18°C (68)

$C_{10}H_{16}O$, Camphor; γ (air) (I) 17°C (68)

$C_{10}H_{16}O_4$, Camphoric acid; γ (air) (I) 16°C (68)

$C_{10}H_{20}O$, Menthol; γ (air) (I) 15°C (68)

$C_{10}H_{20}O_2$, Decylic acid (18) *v.* p. 474 for effect of time on γ

$C_{12}H_{22}O_{11}$, Sucrose
15–40°C (I, II, V) (5, 42, 44, 55, 59)

Wt. %	Δγ (air)
10	0.55±0.2
20	1.0 ±0.2
30	1.4 ±0.3
40	2.1 ±0.4
55	3.7 ±0.5

$C_{12}H_{22}O_{11}.H_2O$
Lactose (I) (59)
100 g hydrate per l solution gives Δγ (air) at 15°C = 0.9 ± 0.4

$C_{12}H_{28}ClN$, Tetrapropylammonium chloride
0°C (I, III) (47)

M	Δγ (air) ±*ca.* 0.5
0.10	− 3.62
0.30	− 6.40
0.50	− 8.15
1.00	−10.55

TWO OR MORE SOLUTES

Standard arrangement (*v.* Vol. III, p. viii)

The B-Component Key-formula Does Not Begin with 16

H_2O

B = **HCl**; C = Dextrose (5); Levulose (5); C = $C_{10}H_{20}O_2$, Decylic acid (18); C = Dextrose; D = Levulose (5); C = Sucrose (5)

B = **H_2SO_4** C = C_2H_5OH (7)

B = **$(NH_4)_2SO_4$**; C = $Al_2(SO_4)_3$ 15°C (I) (59); 0.110 Moles of CBA_{24} per l soln. gives Δγ (air) = 0.94 ± 0.4

B = **NH_4NO_3**; C = $AgNO_3$
100°C (III) (48)

M C	M B	Δγ (air) ±*ca.* 0.5
∞	∞	(49.3)
56.55	90.61	38.0
26.59	42.61	30.1
17.35	27.80	23.3
13.42	21.50	21.3
7.825	12.54	15.5
5.313	8.513	12.6
2.744	4.397	7.7

B = **NH_4NO_3**.—(*Continued*)

M C	M B	Δγ (air) ±*ca.* 0.5
1.438	2.303	4.7
0.838	1.344	3.0

100°C (III) (48)

M*	Δγ (air) ±*ca.* 0.5
∞	(58.1)
76.02	48.2
45.17	45.3
20.70	28.0
11.57	15.1
6.002	8.9
2.155	4.1
1.000	2.3
0.444	1.1

B = **$TlNO_3$**; C = $AgNO_3$, 90°C (III) (48)

M*	Δγ (air) ±*ca.* 0.5
∞	(69.45)
252.37	64.65
102.84	56.55

B = **$TlNO_3$**.—(*Continued*)

M*	Δγ (air) ±*ca.* 0.5
89.02	55.05
27.02	30.85
11.92	16.75
9.16	13.55
5.35	9.65
3.44	7.55
1.528	4.55
0.702	2.65
0.573	2.15
0.255	1.05

* M = Moles B/kg H_2O = Moles C/kg H_2O.

B = **$Cr_2(SO_4)_3$**; C = K_2SO_4 (59)* 0.100 Moles CBA_{24} per l of solution gives Δγ (air) = 0.68 ± 0.4

B = **$NiSO_4$**; C = K_2SO_4 (59)* 0.229 Moles CBA_6 per l of solution gives Δγ (air) = 0.90 ±0.4

B = **$Fe_2(SO_4)_3$**; C = K_2SO_4 (59)* 0.099 Moles CBA_{24} per l of solution gives Δγ (air) = 0.76 ± 0.4

B = **$ZnSO_4$**; C = K_2SO_4 (59)* 0.225 Moles CBA_6 per l of solution gives Δγ (air) = 1.17 ± 0.4

B = **$NaC_2H_3O_2$**, Acetate; C = $KC_2H_3O_2$, Acetate (38)

*By method (I) at 15°C.

Aqueous Solutions of Salt Mixtures

The surface tensions of certain salt mixtures listed below are additive (*i.e.*, $\gamma = u_1\gamma_1 + u_2\gamma_2 + \cdots + u_n\gamma_n$) within the limits of *precision* (±0.1 dyne/cm); γ is the surface tension of a mixture of two or more solutions; u_n is the volume fraction of solution, *n*, in the mixture; γ_n is the surface tension of solution, *n* (52, 64). $N_{max.}$ = maximum concentrations studied, in terms of the total number of equivalents of salts to 100 Moles water.

	$N_{max.}$		$N_{max.}$
NaCl + KCl	3.4	KCl + Na_2SO_4	1.7
Na_2SO_4 + K_2SO_4	1.3	KCl + K_2SO_4	1.9
NaCl + Na_2SO_4	2.2	NaCl + Na_2SO_4 + KCl + K_2SO_4	1.7
NaCl + K_2SO_4	2.3		

The B-Component Key-formula Begins with 16

The ℭ-arrangement

B = **CH_4O**, Methyl alcohol; C = Ethyl bromide, Ethyl iodide, Propyl iodide, Allyl iodide, Ethylene chloride, Ethylene bromide, Ethylidene chloride, Chloroform, Carbon tetrachloride, Tetrachloroethylene, Benzene, Toluene, Aniline, *o*-Toluidine, *p*-Toluidine, Phenol, Resorcinol, Hydroquinol, Nitrobenzene, *o*-Nitrotoluene, *p*-Nitrotoluene (59).

B = **NH_4CHO_2**, Formate; C = $NaC_7H_5O_3$, Salicylate (38)

B = **C_2H_6O**, Ethyl alcohol; C = Glycerol (7); Benzene (64); Phenol (59, 64); Aniline (59, 64)

B = **$C_4H_8O_2$**, Isobutyric acid; C = $C_5H_{10}O_2$, Isovaleric acid (56); C = $C_6H_{12}O_2$, Isocaproic acid, (56)

B = **$C_5H_{10}O_2$**, Isovaleric acid; C = $BaC_{10}H_{18}O_4$, Isovalerate (56)

B = **C_6H_7N**, Aniline; C = NaCl (65)

B = **$C_6H_{12}O_6$**, Dextrose; C = Levulose (5)

B = **$NH_4C_7H_5O_3$**, Salicylate; C = $KCHO_2$, Formate (38)

B = **$C_{12}H_{22}O_{11}$**, Sucrose; C = NaOH, NaI, Na_2SO_4, $NaHCO_3$ (5)

NON-AQUEOUS SOLUTIONS

One Solute

Inorganic Substances in Organic Solvents

CH_4O

Methyl alcohol

B = I_2

1.00 Mole I_2 per l of solution in CH_3OH at 25.6°C in air (III) gives Δγ = 0.86 ± *ca.* 0.2 (6)

C_2H_6O

Ethyl alcohol (4)

B = **NaBr**

17–20°C (I)

Mol B/l_s	Δγ (air) ±0.3
0.02	0.16
0.04	0.37

B = **NaBr**.—(*Continued*)

Mol B/l_s	Δγ (air) ±0.3
0.07	0.51
0.12	0.69

B = **NaI**

0.03	0.44
0.06	0.56
0.39	1.01
0.94	1.54

B = **$KC_2H_3O_2$**, Acetate

0.13	0.45
0.31	0.52
0.94	0.78
1.26	0.96

Mixtures of Two Organic Compounds

CCl_4

B = $CHCl_3$, 18°C (III) [64]

M % B	γ (air) ±0.2
0	27.00
20	26.93
40	26.92
50	26.92
60	26.94
80	27.09
100	27.33

B = $C_2H_4O_2$, Acetic acid, 18°C (III) [64]

M % A	γ (air) ±0.3
0	28.08
20	26.70
40	26.29
50	26.26
60	26.28
80	26.52
100	27.05

B = C_2H_5I, Ethyl iodide [67]

B = $C_4H_8O_2$, Ethyl acetate [67]

B = C_6H_6, Benzene (I) [45]

t, °C	γ ±0.2
$x_B = 0$	
11.8	27.98
46.0	23.70
78.0	19.93
$x_B = 10/27$	
13.2	28.63
46.6	24.33
78.4	20.20
$x_B = 1/2$	
16.0	28.67
46.2	24.32
78.2	20.40
$x_B = 2/3$	
10.8	29.55
46.2	24.83
78.2	20.70
$x_B = 1$	
11.2	30.23
46.0	25.57
78.0	21.42

CS_2

B = $CHCl_3$, 18°C (III) [64]

Wt. % B	γ (air) ±0.5
0	32.24
20	30.59
40	29.58
60	28.42
80	27.78
100	27.33

Wt. % B	13.0°C	46.4°C	61.2°C
	γ ±0.4 (I) [46]		
0.00	33.40	28.47	26.31
19.81	31.27	26.83	24.85
40.14	30.10	25.62	23.66
60.34	29.12	24.79	22.81
80.32	28.45	24.19	22.30
100.00	28.18	23.84	21.90

B = CH_4O, Methyl alcohol, v. [64]

B = $C_2H_4Cl_2$, Ethylene chloride, 18°C (III) [64]

M % B	γ (air) ±0.4
0	32.24
20	30.89
40	30.64
50	30.63
60	31.06
80	31.56
100	32.66

B = C_3H_6O, Acetone (I) [66]

t, °C	γ (air) ±0.3
Wt. % B = 0.00	
14.0	33.19
28.5	31.06
44.0	28.76
Wt. % B = 13.57	
16.0	27.71
38.0	25.44
Wt. % B = 34.23	
15.0	25.86
29.5	24.10
39.0	22.84
Wt. % B = 71.53	
18.0	24.21
38.0	21.67
Wt. % B = 100.00	
14.4	24.33
35.0	21.91
53.0	19.53

B = $C_4H_{10}O$, Ethyl ether, 18°C (III) [64]

Wt. % B	γ (air) ±0.5
0	32.24
20	25.35
40	21.87
60	20.46
80	18.68
100	17.47

25°C (III) [31]

Wt. % B	γ (air) ±1.0
0.00	32.39
13.10	27.11
34.37	22.63
62.76	19.30
100.00	16.92

B = C_6H_6, Benzene, 18°C (III) [64]

Wt. % A	γ (air) ±0.4
0	28.98
20	29.13
40	29.36
60	29.79
80	30.66
100	32.24

B = C_7H_8, Toluene, 25°C (III) [31]

Wt. % B	γ (air) ±1.0
0.00	32.29
7.27	31.91
37.99	30.17
63.24	28.93
100.00	27.68

$CHCl_3$

B = $C_2H_4O_2$, Acetic acid, 18°C (III) [64]

M % A	γ (air) ±0.2
0	28.00
20	26.98
40	26.62
50	26.67
60	26.70
80	26.95
100	27.40

B = C_2H_6O, Ethyl alcohol (I) [46]

Wt. % B	10.0°C	46.2°C	78.2°C
	γ ±0.4		
0	28.58	23.75	19.68
20	26.58	22.39	18.65
40	25.40	21.63	18.21
60	24.58	21.10	17.98
80	23.95	20.76	17.82
100	23.61	20.47	17.67

B = C_3H_6O, Acetone, 18°C (III) [64]

M % A	γ (air) ±0.2
0	23.76
20	24.38
40	25.23
60	25.98
80	26.72
100	27.33

B = $C_4H_{10}O$, Ethyl ether, 18°C (III) [64]

Wt. % B	γ (air) ±0.3
0	27.33
20	23.94
40	21.82
60	19.88
80	18.54
100	17.46

B = C_6H_6, Benzene, 18°C (III) [64]

Wt. % A	γ (air) ±0.2
0	28.94
20	28.57
40	28.11
60	27.78
80	27.59
100	27.33

B = $C_8H_{20}BrN$, Tetraethylammonium bromide (I) [63]

t, °C	γ(?) ±0.3
Wt. % B = 0	
15.9	27.71
37.0	24.79
Wt. % B = 6.12	
25.0	26.81
34.4	25.66
54.0	23.31
Wt. % B = 7.48	
20.5	27.58
40.9	25.10
50.6	23.92

CH_2O_2

Formic acid

B = $C_2H_4O_2$, Acetic acid [28]

CH_4O

Methyl alcohol

B = C_2H_5I, Ethyl iodide [67]

B = C_2H_6O, Ethyl alcohol (II) [40]

Wt. % A	0°C	30°C	50°C
	γ (air) ±0.3		
0.00	23.91	21.49	19.88
50.45	24.23	21.65	19.91
100.00	24.48	21.80	20.13

B = C_3H_6O, Acetone (II) [40]

Wt. % A	0°C	30°C
	γ (air) ±0.2	
0.00	26.08	22.34
33.25	25.98	22.55
39.88	25.89	22.52
49.84	25.76	22.46
59.83	25.55	
100.00	24.48	21.81

B = C_3H_8O, *n*-Propyl alcohol [28]

B = C_6H_6, (II) [40]

Wt. % A	0°C	30°C
	γ (air) ±0.3	
0.00	31.55	27.57
15.04		26.08
19.94	29.12	
20.06		25.68
25.00	28.74	
25.10		25.38
30.07	28.40	
30.13		25.09
50.04		24.09
70.07	26.10	
75.15		22.91
100.00	24.48	21.80

$C_2H_4Br_2$

Ethylene bromide

B = $C_2H_4O_2$, Acetic acid (I) [46]

Wt. % A	14°C	46°C	78°C	132°C
	γ ±0.7			
0.0	27.67	24.73	21.81	16.70
14.4	28.53	24.83	21.68	16.94
27.8	29.15	25.17	21.90	16.83
49.4	29.84	26.27	22.94	17.69
69.4	31.22	27.58	24.20	18.63
86.6	32.75	29.29	25.90	20.49
93.6	32.94	30.28	28.16	22.71
100.0	40.02	35.66	31.31	24.50

B = $C_3H_6Br_2$, 1, 2-Dibromopropane [67]

B = C_6H_5Cl, Chlorobenzene (I) [45, 46]

Wt. % B	13°C	46°C	78°C	132°C
	γ ± 0.5			
0.00	40.16	35.66	31.31	24.50
20.12	36.75	32.54	28.69	22.57
39.46	35.77	31.51	27.59	21.41
60.35	35.49	31.29	27.41	21.16
79.95	34.29	30.17	26.37	20.31
100.00	34.43	30.37	26.60	20.53

$C_2H_4Cl_2$
Ethylene chloride

B = C_6H_6, Benzene (I) [66]

t, °C	γ (air) ±0.3
Wt. % A = 0.00	
14.0	29.65
45.0	25.63
70.0	22.40
Wt. % A = 26.24	
14.0	30.00
50.0	25.53
Wt. % A = 48.68	
14.5	30.39
45.0	26.56
70.0	23.45
Wt. % A = 68.10	
15.0	31.04
41.0	27.71
58.0	25.52
Wt. % A = 100 00	
12.5	33.08
43.0	28.91

$C_2H_4O_2$
Acetic acid

B = C_2H_5I, Ethyl iodide, 18°C (III) [64]

M % B	γ (air) ±1.0
0	28.08
20	26.71
40	26.69
50	26.83
60	27.02
80	27.66
100	28.83

B = C_5H_5N, Pyridine (I) [66]

t, °C	γ (air) ±1.0
Wt. % A = 0.00	
13.0	39.39
49.0	34.14
80.0	29.37
Wt. % A = 26.28	
17.0	37.66
52.0	33.17
76.0	29.90
Wt. % A = 47.67	
12.0	36.88
47.0	33.05
75.0	29.83
Wt. % A = 71.39	
14.0	34.50
49.0	30.92
75.0	28.24
Wt. % A = 100.00	
14.5	28.19
52.0	24.48
75.0	22.08

B = C_6H_6

30°C (II) [40]

Wt. % A	γ (air) ±0.2
0.00	27.56
25.10	26.52
49.77	25.98
61.48	25.85
75.42	25.93
100.00	26.61

B = C_6H_6.—(*Continued*)

18°C (III) [64]

Wt. % A	γ (air) ±0.3
0.00	28.94
34.07	27.89
53.57	27.53
75.47	27.52
100.00	28.00

15°C (II) [40]

Wt. % A	γ (air) ±0.2
0.00	29.55
55.13	27.79
60.40	27.66
65.20	27.65
100.00	28.13

B = C_7H_8, Toluene (I) [46]

Wt. % B	15.0°C	45.9°C	78.0°C	131.6°C
	γ ±0.7			
0.00	27.57	24.74	21.75	16.73
20.08	27.55	24.22	20.83	15.59
40.32	27.55	24.11	20.66	15.30
60.02	27.88	24.32	20.75	15.32
75.20	28.36	24.66	21.03	15.40
87.83	28.57	24.88	21.23	15.58
100.00	29.21	24.48	21.81	16.17

C_2H_5I
Ethyl iodide

B = $C_4H_8O_2$, Ethyl acetate [67]

B = $C_4H_{10}O$, Ethyl ether, 25°C (III) [31]

Wt. % B	γ (air) ±1.0
0.00	30.52
37.20	21.29
100.00	16.92

B = C_6H_6, 18°C (III) [64]

M % A	γ (air) ±1.0
0	28.94
20	28.74
40	28.64
50	28.61
60	28.64
80	28.67
100	28.83

C_2H_6O
Ethyl alcohol

B = C_3H_6O, Acetone (II) [40]

Wt. % A	0°C	20°C	45°C
	γ (air) ±0.3		
0.00	26.09	23.58	20.48
20.03		23.40	
40.06		23.20	
50.00	25.16	23.09	20.54
79.70		22.69	
100.00	23.91	22.30	20.28

B = C_6H_6 (II) [40]

Wt. % A	25°C γ (air) ±0.2	Wt. % A	45°C γ (air) ±0.2
0.00	28.23	0.00	25.61
20.04	26.17	19.96	23.94
50.06	24.49	25.00	23.67
75.04	23.19	29.83	23.43
100.00	21.89	100.00	20.28

B = C_6H_6.—(*Continued*)

(I) [46]

Wt. % A	10°C	46.2°C	78.2°C
	γ ±0.3		
0.00	30.39	25.53	21.40
20.17	27.91	23.75	20.11
37.14	26.91	23.01	19.60
57.88	25.82	22.18	18.96
74.51	24.92	21.51	18.44
84.16	24.43	21.10	18.14
100.00	23.61	20.47	17.67

B = C_6H_6O, Phenol (II) [40]

Wt. % A	0°C γ (air) ±0.4	35°C γ (air) ±0.3
0.00	42.99	39.28
25.39		33.23
49.44		28.11
50.20	31.28	
59.73	29.52	
74.60	27.10	24.01
100.00	23.91	21.09

C_3H_6O
Acetone

B = $C_5H_{10}O_2$, Propyl acetate, 15°C (II) [37]

Wt. % A	γ (air) ±0.2
0.00	24.94
49.70	24.47
100.00	24.16

B = C_6H_5Cl, Chlorobenzene, 15°C (II) [37]

Wt. % B	γ (air) ±0.2
0.00	24.16
50.25	27.50
100.00	33.88

B = C_6H_6

15°C (II) [37]

Wt. % B	γ (air) ±0.2
0.00	24.16
45.22	26.59
100.00	29.55

18.2°C (III) [64]

Wt. % B	γ (air) ±0.3
0	23.72
20	24.65
40	25.60
50	26.18
60	26.77
80	27.76
100	28.94

B = C_6H_6O, Phenol (II) [40]

Wt. % A	0°C γ (air) ±0.4	35°C γ (air) ±0.2
0.00	42.99	39.28
38.47		31.53
60.0	31.28	27.07
70.78	29.47	
100.00	26.06	21.70

$C_3H_6O_2$
Ethyl formate

B = C_7H_8, Toluene (II) [37]

Wt. % B	15°C	40°C
	γ (air) ±02	
0.00	24.34	21.21
27.33	25.33	22.24
51.13	26.28	23.27
82.02	27.94	24.97
100.00	29.12	26.19

$C_3H_6O_2$
Methyl acetate

B = $C_4H_8O_2$, Ethyl acetate [28]

C_3H_8O
n-Propyl alcohol

B = C_6H_7N, Aniline [28]

$C_3H_8O_2$
Methylal

B = $C_6H_{12}O_2$, Isobutyl acetate, 18°C (III) [64]

M % B	γ (air) ±0.5
0	21.43
20	22.13
40	22.72
50	22.95
60	23.20
80	23.66
100	24.04

$C_4H_5Cl_3O_2$
Ethyl trichloroacetate

B = $C_4H_8O_2$, Ethyl acetate [28]

$C_4H_8O_2$
Ethyl acetate

B = $C_5H_{12}O$, Isoamyl alcohol, 18°C (III) [64]

M % B	γ (air) ±0.3
0	24.22
20	24.19
40	24.17
50	24.16
60	24.13
80	24.15
100	24.29

B = $C_6H_5NO_2$, Nitrobenzene, 20°C (I) [21]

Wt. % A	γ ±*ca.* 0.7
0.00	43.21
15.00	36.61
29.24	32.58
36.57	31.35
55.55	28.31
79.89	25.47
92.02	24.81
100.00	23.67

B = C_6H_6, 20°C (I) [21]

Wt. % A	γ ±*ca.* 0.7
0.00	29.03
20.90	27.69
39.96	26.54
60.33	25.37
80.40	24.57
100.00	23.72

B = $C_7H_{14}O_2$, *n*-Amyl acetate (28)

B = $C_8H_{11}N$, Dimethylaniline, 20°C (I) (21)

Wt. % B	γ ±*ca.* 0.7
0.00	23.67
18.43	25.37
39.89	26.87
50.08	28.69
77.32	31.41
100.00	36.51

B = $C_8H_{14}O_4$, Diethyl succinate (28)

B = $C_9H_{10}O_2$, Ethyl benzoate (28)

B = $C_{10}H_{22}O$, Isoamyl ether (28)

$C_4H_8O_2$

Methyl propionate

B = C_7H_8, Toluene (II) (37)

Wt. % B	15°C γ (air) ±0.2	40°C γ (air) ±0.2
0.00	25.52	22.46
32.67	26.65	23.52
46.20	27.08	24.05
74.99	28.17	25.13
100.00	29.12	26.19

B = $C_{14}H_{20}O_2$, Amyl hydrocinnamate (II) (37)

Wt. % B	15°C γ (air) ±0.2	40°C γ (air) ±0.2
0.00	25.52	22.46
51.52	28.21	25.38
100.00	32.45	30.30

$C_4H_{10}O$

Ethyl ether

B = C_6H_6, 18°C (III) (64)

Wt. % A	γ (air) ±0.3
0	28.94
20	25.43
40	22.82
50	21.72
60	20.67
80	18.99
100	17.44

25°C (III) (31)

Wt. % A	γ (air) ±0.5
0.00	28.25
24.31	24.26
43.08	21.76
71.42	18.24
100.00	16.92

$C_5H_{10}O_2$

Ethyl propionate

B = C_6H_5Cl, Chlorobenzene, 10°C (II) (37)

Wt. % B	γ (air) ±0.2
0.00	25.34
50.25	29.95
100.00	34.52

B = C_6H_6, 10°C (II) (37)

Wt. % B	γ (air) ±0.2
0.00	25.34
42.93	27.35
54.55	27.89
100.00	30.21

B = C_7H_8, Toluene, 10°C (II) (37)

0.00	25.34
51.87	27.58
100.00	29.70

$C_5H_{10}O_2$

Methyl *n*-butyrate

B = C_6H_5Cl, Chlorobenzene (II) (37)

Wt. % B	15°C γ (air) ±0.2	40°C γ (air) ±0.2
0.00	25.55	22.68
53.51	29.13	26.18
100.00	33.88	30.77

B = C_6H_6 (II) (37)

Wt. % B	15°C γ (air) ±0.2	40°C γ (air) ±0.2
0.00	25.55	22.68
33.62	26.83	23.81
50.77	27.49	24.38
77.25	28.65	25.39
100.00	29.54	26.26

$C_5H_{10}O_2$

Propyl acetate

B = $C_5H_{10}O_3$, Ethyl lactate (II) (37)

Wt. % B	15°C γ (air) ±0.2	40°C γ (air) ±0.2
0.00	24.94	22.10
28.68	26.09	23.27
51.59	27.13	24.36
78.83	28.77	26.09
100.00	30.50	27.92

B = C_6H_6 (II) (37)

0.00	24.94	22.10
54.97	27.32	24.23
100.00	29.54	26.26

B = $C_6H_{12}O_2$, Amyl formate (28)

$C_5H_{11}N$

Piperidine

B = C_7H_8, Toluene (I) (45)

t, °C	γ ±0.3
x_B = 0	
15.2	30.71
46.6	27.13
78.4	23.25
132.5	17.31
x_B = 1/6	
14.9	30.49
46.6	26.64
78.4	22.95
132.5	17.06

B = C_7H_8.—(*Continued*)

t, °C	γ ±0.3
x_B = 5/6	
14.5	29.63
46.6	25.75
78.4	22.29
132.5	16.37
x_B = 1	
15.2	29.17
46.6	25.46
78.4	21.66
132.5	16.07

C_6H_5Br

Bromobenzene

B = C_6H_5Cl, Chlorobenzene (28)

B = C_7H_8, Toluene (67)

C_6H_5Cl

Chlorobenzene

B = C_6H_6 (II) (37)

Wt. % B	10°C γ (air) ±0.2	40°C γ (air) ±0.2
0.00	34.52	30.77
30.18	32.81	28.99
44.54		28.24
46.94	32.09	
71.19	31.19	
72.67		27.09
100.00	30.21	26.26

B = C_7H_8, Toluene (II) (37)

0.0	34.52	30.77
21.99	33.14	29.54
51.08	31.62	27.99
77.30	30.57	26.95
100.00	29.70	26.19

$C_6H_5NO_2$

Nitrobenzene

B = C_6H_6, 55°C (I) (21)

Wt. % B	γ ±*ca.* 1.5
0.00	38.73
11.85	34.69
35.46	29.27
52.27	27.70
71.77	25.46
89.01	24.27
100.00	23.41

B = C_7H_8, Toluene, 55°C (I) (21)

Wt. % A	γ ±*ca.* 1.5
0.00	23.42
31.62	25.74
71.48	30.67
91.70	35.52
100.00	37.91

B = C_7H_9N, Methylaniline (28)

B = C_7H_9N, *o*-Toluidine (28)

B = $C_8H_{11}N$, Dimethylaniline (28)

B = $C_8H_{11}N$, Ethylaniline (28)

B = $C_{10}H_{15}N$, Diethylaniline (28)

C_6H_6

B = C_6H_6O, Phenol, 35°C (II) (40)

Wt. % A	γ (air) ±0.2
0.00	39.28
24.86	33.63
35.18	32.11
50.11	30.43
100.00	26.91

B = C_6H_7N, Aniline, 20°C (I) (21)

Wt. % A	γ ±*ca.* 1.5
0.00	44.11
11.41	39.61
33.35	35.31
88.60	29.66
100.00	29.03

B = C_7H_8, Toluene, 18°C (III) (64)

M % A	γ (air) ±0.2
0	28.59
20	28.63
40	28.67
50	28.69
60	28.75
80	28.80
100	28.94
Wt. % A	**γ (air) ±0.2**
10.8°C (II) (37)	
0.00	29.61
24.98	29.76
50.07	29.85
75.06	30.02
100.00	30.11
40°C (II) (37)	
0.00	26.19
24.99	26.11
47.69	26.12
74.98	26.15
100.00	26.26
25°C (III) (31)	
Wt. % A	**γ (air) ±0.3**
0.00	27.68
30.59	27.95
66.58	28.14
90.72	28.24
91.56	28.22
100.00	28.25

B = C_7H_8O, *m*-Cresol (28)

B = C_8H_{10}, *m*-Xylene (28)

B = $C_9H_{13}N$, Dimethyl-*o*-toluidine, 54.6°C (I) (21)

Wt. % B	γ ±*ca.* 1.5
0.00	23.26
11.50	23.48
23.36	24.13
44.07	25.18
63.19	25.95
76.99	26.43
89.56	26.91
100.00	27.92

C_6H_6.—(*Continued*)

B = $C_{51}H_{98}O_6$, Tripalmitin (I) (62)

t, °C	γ (air) ±0.3
Wt. % B = 1.98	
39.8	26.31
32.2	27.28
27.4	27.95
Wt. % B = 4.07	
50.3	24.93
40.4	26.16
36.5	26.71
Wt. % B = 7.78	
48.9	25.01
39.3	26.32
29.3	27.59

B = $C_{57}H_{110}O_6$, Tristearin (I) (62)

t, °C	γ (air) ±0.3
Wt. % B = 2.08	
31.3	27.35
48.4	25.17
25.5	28.12

C_6H_7N

Aniline

B = C_7H_8, Toluene, 20°C (I) (21)

Wt. % B	γ ±*ca.* 1.5
0.00	44.13
19.16	36.89
39.93	33.50
59.05	31.47
74.57	30.12
100.00	28.68

B = C_7H_9N, *o*-Toluidine, 54°C (I) (21)

Wt. % A	γ ±*ca.* 0.5
0.00	35.78
16.33	35.94
39.91	36.69
60.53	37.28
82.89	37.84
91.67	38.21
100.00	38.50

B = $C_8H_{11}N$, Dimethylaniline, 54.7°C (I) (21)

Wt. % B	γ ±*ca.* 0.5
0.00	38.50
19.59	37.00
46.08	35.52
64.42	34.43
82.60	33.33
100.00	32.25

C_7H_8

Toluene

B = C_7H_8O, *m*-Cresol (28)

B = C_7H_9N, *o*-Toluidine, 54.5°C (I) (21)

Wt. % A	γ ±*ca.* 1.0
0.00	35.78
17.69	31.51
58.59	26.46
88.84	24.59
100.00	23.45

B = $C_8H_{11}N$, Dimethylaniline, 20°C (I) (21)

Wt. % A	γ ±*ca.* 0.5
0.00	36.51
12.95	34.88
20.86	33.90
39.81	32.10
59.53	30.78
79.24	29.65
100.00	28.68

B = $C_9H_{10}O_2$, Ethyl benzoate, 25°C (III) (31)

Wt. % A	γ (air) ±0.5
0.00	35.26
15.28	33.58
47.32	30.37
76.17	28.92
100.0	27.68

B = $C_9H_{13}N$, Dimethyl-*o*-toluidine, 54.6°C (I) (21)

Wt. % B	γ ±*ca.* 1.5
0.00	23.50
28.44	24.53
53.30	25.39
60.12	25.92
80.22	26.71
100.00	27.92

C_7H_8O

m-Cresol

B = C_7H_9N, *o*-Toluidine (28)

B = $C_8H_{11}N$, Dimethylaniline (28)

C_8H_{10}

o-Xylene

B = C_8H_{10}, *m*-Xylene (28)

B = C_8H_{10}, *p*-Xylene (28)

C_8H_{10}

m-Xylene

B = C_8H_{10}, *p*-Xylene (28)

B = $C_8H_{11}N$, Dimethylaniline (28)

Two or More Solutes

$I_2 + CH_3OH + KI$ (6).

A = SiO_2; B = CaO; C = Na_2O, *v.* Vol. II, p. 96.

A = $CHCl_3$; B = C_3H_6O, Acetone; C = C_6H_6 (64).

A = $C_2H_4O_2$, Acetic acid; B = C_2H_5I; C = C_6H_6 (64).

A = C_3H_6O, Acetone; B = C_6H_6; C = C_7H_8 (37).

A = $C_4H_8O_2$, Methyl propionate; B = C_6H_6; C = C_7H_8 (37); B = $C_5H_{10}O_3$, Ethyl lactate; C = C_6H_6; D = C_7H_8 (37).

A = $C_5H_{10}O_2$, Ethyl propionate; B = C_6H_6; C = C_7H_8 (37); B = C_6H_5Cl; C = C_6H_6; D = C_7H_8 (37).

A = $C_5H_{10}O_2$, Methyl *n*-butyrate; B = $C_5H_{10}O_2$, Propyl acetate; C = C_6H_6; D = C_7H_8 (37); C = $C_4H_8O_2$, Methyl propionate; D = C_6H_6; E = C_7H_8 (37).

A = C_6H_5Cl; B = C_6H_6; C = C_7H_8 (37).

VARIATION OF SURFACE TENSION WITH AGE OF SURFACE

From experiments on water with the method of the "vibrating jet," Bohr (3) concludes that the surface tension is constant after the surface is 0.06 second old, and that the method gives no evidence in favor of a change prior to this time.

Data, obtained by the capillary-height method, have been presented (23, 26, 53) in support of the idea of Lenard (30) that some pure liquids and salt solutions exhibit higher values of γ at periods of the order of 0.001 to 0.01 second after their formation, than the static or equilibrium value. The evidence of these elaborate experiments suffers from the defect that the variation of the thickness of the liquid film on the walls of the capillary with the time may be great enough to give rise to all of the variations observed, since the effective diameter of the tube of liquid is less at such time intervals than later.

The surface tension of an aqueous solution of a surface-active substance decreases with time, since the surface region contains at equilibrium a larger concentration of the solute than the phasal region. The rate of decrease depends upon the concentration of the solution and that of the surface region, and the diffusion coefficient of the solute.

Variation of the Surface Tension of an Aqueous Solution of Decylic Acid (0.000064 Mole per l) with the Time (t = 20°C) (18)

Min	0.0	0.5	1.0	5.0	8.0	30.0
γ	(72.8)*	65.7	62.0	58.2	57.6	56.0

* Assumed.

Effect of Time upon the Interfacial Tension of Benzene 0.001 Mole per l of Sodium Oleate in Water at 20°C (19)

Min	0.0	0.5	1.0	2.0	3.0	5.0	7.5	10.0
γ	(35.0)*	14.1	12.9	11.9	11.0	10.7	10.7	10.7

* Assumed.

EFFECT OF NATURE OF THE GAS* AT THE INTERFACE ¶

Liquid	Gas	t, °C	$\frac{100(\gamma_G - \gamma_A)}{\gamma_A}$	$\frac{100(\gamma_G - \gamma_V)}{\gamma_V}$	Method	Lit.
H_2O	Vap.	20	0.035	(0.0)	(I)	(49)
	Vap.	20	0.2	(0.0)	(I)	(57)
	CO_2	15	−1.1		(III)	(11)
	CO_2	18		−0.83	(I)	(57)
	CO_2	20	−1.0		(V)	(55)
	N_2O	25.2		−0.85	(I)	(57)
	H_2S	15.2		−1.29	(I)	(57)
	H_2	20	0.0		(V)	(55)
	Various organic vapors				(II)	(27)
CCl_4	CO_2	25		−1.0	(I)	(57)
CS_2	CO_2	24.8		−1.0	(I)	(57)
$CHCl_3$	CO_2	17	−2.1		(III)	(11)
CH_3OH	CO_2	17	−1.5		(III)	(11)
C_2H_5OH	Vap.	19	0.5		(I)	(57)
	CO_2	25.3		−1.0	(I)	(57)
	CO_2	18	−1.2		(III)	(11)
	H_2S	16.1		−1.3	(I)	(57)
	N_2O	25.1		−1.0	(I)	(57)

Liquid	Gas	t, °C	$\frac{100(\gamma_G - \gamma_A)}{\gamma_A}$	$\frac{100(\gamma_G - \gamma_V)}{\gamma_V}$	Method	Lit.
$(C_2H_5)_2O$	Vap.	20	0.3		(I)	(49)
	Vap.	20	0.4		(I)	(57)
	CO_2	25.3		−1.0	(I)	(57)
	CO_2	15	−1.3		(III)	(11)
	N_2O	25.0		−0.8	(I)	(57)
C_6H_6	Vap.	20	0.5		(I)	(49)
	Vap.	18	0.3		(I)	(57)
	CO_2	25.1		−1.0	(I)	(57)
	CO_2	17	−1.8		(III)	(11)
	H_2S	15.3		−1.2	(I)	(57)

For other values of γ (air) $-$ γ (vap.), *v.* 𝔄-𝔅-Table and ℭ-Table¶

* Total pressure is one atm. except when only vapor of the liquid is present

Variation with Pressure of the Gas; *ca.* 21°C (I) ‖ (29)

$p_{atm.}$	γ	$p_{atm.}$	γ
CS_2-Air		C_2H_5OH-H_2	
1	32.2	51	20.1
49	28.8	155	18.0
56	22.3	$(C_2H_5)_2O$-Air	
$CHCl_3$-Air		1	16.9
1	1	32	14.1
51	0.830	141	8.3
150	0.608	$(C_2H_5)_2O$-H_2	
C_2H_5OH-Air		1	17.0
1	22.2	51	15.7
24	20.6	152	13.4
212	12.1	$(C_2H_5)_2O$-CO_2	
C_2H_5OH-H_2		1	16.1
1	21.3	24	11.0

NOTES

† These data are not to be used for the calculation of $\frac{d\gamma}{dt}$, or any of its derived functions such as the Eötvös constant, k_E.

‡ Prepared from levo-rotatory *sec.*-butyl carbinol.

§ No basis for estimation of error. Author considers error to be 0.5 % of largest value.

‖ The density at pressure, P, assumed equal to that at one atmosphere.

¶ For *m*-xylene, *m*-cresol, propionitrile, butyronitrile and aniline, Renard and Guye (69) found that γ (air) = γ (vapor) ± 1 %.

** The same apparatus yields for *dl*-methyl hexyl carbinol: $\gamma_{10°} = 26.7$; and $\gamma_{80°} = 20.76$. It is probable that all of the results are 3 or 4 % low due to faulty calibration.

†† There is no basis for the estimation of errors.

‡‡ There is no basis for the estimation of errors. It is probable however that due to faulty calibration results are about 3 or 4 % low.

§§ This work may be more accurate than is indicated. The precision is high (± 0.2 dyne/cm), but as far as can be determined from the data of other observers the surface-tension values are frequently about 0.5 to 1.0 dyne/cm too high. The disagreement may be due to impurities in one of the two samples compared in each case, or it may be due to errors inherent in the present form of the bubble-pressure method.

LITERATURE

(For a key to the periodicals see end of volume)

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PROPERTIES OF THIN FILMS AND SURFACE LAYERS

N. K. Adam

Films of Metals on Glass

Films deposited by cathode sputtering, condensation from metallic vapor *in vacuo*, or by chemical deposition from solution, vary in properties with the method of deposition, age of the film, heat treatment, surrounding atmosphere, and with any conditions which affect the size and closeness of packing of the metallic aggregates of which these films appear to be composed.

Films of nickel are almost amorphous when deposited but a crystalline structure is developed on annealing. The magnetic properties are found only with the crystalline films (28).

The *electrical conductivity* is always smaller than in bulk metals, when films are less than 2000 Å thick; it is usually from one-half to one-fifth of the bulk conductivity; it decreases gradually with decreasing thickness until a critical thickness is reached, when it falls to practically zero.

Volume Conductivity, κ, of a Typical Sputtered Film (Pt) of Thickness, l (50); *cf.* (20)

l, Å	12	26	72	238	600	1320	2450
κ, ohm^{-1}-cm^{-1}	20	14600	23300	22600	24800	24200	25600

Approximate Average Critical Thickness

Metal	Pt	Pd	Au	Cu	Ag	W
l_c, Å	70	100	120	90	300	100
Lit.	(40, 42, 50, 58)	(42)	(42)	(50)	(42, 58)	(58)

The temperature coefficient of electrical resistance varies greatly with the structure of the films. It is always less than that of metals in bulk, and may be negative (14, 32, 37, 40).

The *optical properties* of metal films vary with the state of aggregation of the particles in the film, with the purity of the metal, and with other factors. There is a rapid change in the

values of the coefficient of absorption and refractive index, at about the same thickness at which the rapid fall of electrical conductivity occurs ([19, 35, 39, 42]).

Thermoelectric properties ([27]).

Change of resistance in magnetic field ([14, 40]).

Photo-resistance effect ([9]).

Surface Layers on Mercury

Approx. thickness, l, determined optically

Layer		Air	Oil
l, Å	16 ([23])	17.4 to 27.6 ([43])	10.7 to 22 ([43])	<50 ([18])

The surface tension, γ, of mercury when measured in a vapor of pressure, p, becomes nearly constant when the area, A, per adsorbed molecule (as computed from the Gibbs equation $A = -RT \left(\frac{\partial \log_e p}{\partial \gamma}\right)_{S,T}$) has decreased to *ca.* 27 Å^2 in the case of methyl acetate and to *ca.* 21 Å^2 in the case of benzene ([29]).

Films of Insoluble Fatty Substances on Aqueous Solutions

The films are one molecule thick, with the polar end of the molecule anchored to the water ([1, 34]). They exist in the condensed form (*i.e.*, molecules in contact) at low temperatures. Measurement of the areas of films containing a known number of molecules under different conditions give the area of cross-section of various atomic groupings within the molecules, as packed in the films, within *ca.* 3%.

Condensed Films, Sections of Organic Groups

Substance and group measured	Maximum section, Å^2	Lit.
Var., hydrocarbon chain, $-C_nH_{2n+1}$*	20.4	(2, 6)
Amides: $-CONH_2$	<21	(2, 5)
Esters of long chain acids: $-CH_2CH_2CO_2R$†	22	(2, 5, 6)
Acetates of long chain alcohols: $-CH_2CO_2CH_3$	23	(6)
Alcohols: $-CH_2CH_2OH$	21.6	(2, 6, 34)
Saturated acids: $-CH_2CH_2CO_2H$	20.4 or 25.1‡	(1, 2, 6, 34)
Isooleic acid: $-CH=CHCO_2H$	20.4 or 28.7‡	(2)
Ethyl isooleate: $-CH=CHCO_2C_2H_5$	28.7	(5)
Benzene ring ⊥ to surface: $-C_6H_4-(OH)$, (NH_2) or (OCH_3)	23.8	(4)
Acetanilide: $-C_6H_4-NHCOCH_3$	28.2 or 25.8§	(4)
Acetamides: $-CH_2NHCOCH_3$	20.4 or 24.2§	(6)
Urea derivatives: $-NHCONH_2$	20.4 or 25.5§	(2, 5, 6)
Triglycerides	63	(2, 34)
Pentaerythritol tetrapalmitate	100	(6)
Glycol dipalmitate	42	(2)
Cholesterol	39	(36)
Hydrolecithin	53	(36)

* $n > 13$. † R is CH_3, C_2H_5, or C_3H_5.
‡ Two packings depending on acidity of solution.
§ Two packings stable above and below a transition temp.

Transition Temperatures between Two Forms of Condensed Film ([2, 4, 5, 6])

Compressibility of a film of stearic acid in condition of close packed chains is *ca.* 0.5% for an increase in compression of 10 dyne/cm. Calculated on the thickness, this is approximately the same as for the substance in bulk ([2]).

Expanded Films

Rise of temperature causes a sudden increase in area, at temperature θ (about 10°C is generally required for completion of the change). The close packed, vertically oriented structure is destroyed. Expanded films are analogous either to liquids, tending (when one chain only is present in the molecules) to 48 Å^2 per molecule at no compression, or to gases under high compression. Both forms have much greater compressibility than condensed films. θ, the temperature of half expansion under 1.4 dyne/cm compression, increases by about 10° near 0° and about 7° near 60°C, on adding one carbon atom to the hydrocarbon chain. (The increase in θ is less than this if several chains are present.) θ also depends on the nature of the end group of the molecule and on the substances dissolved in the water. θ is raised slightly by compressing the film.

Substance	C atoms in chain	Surface	θ, °C at 1.4 dyne/cm	State*	Lit.
Lauric acid	12	dil. HCl	<0	l	(3, 8)
Tridecylic acid	13	dil. HCl	<0	l	(3, 8)
Myristic acid	14	dil. HCl	9	l	(3, 8)
Palmitic acid	16	dil. HCl	28.5		(3, 8)
Stearic acid	18	dil. HCl	46		(3)
Eicosoic acid	20	dil. HCl	57.5		(6)
Behenic acid	22	dil. HCl	72.5		(3)
Methyl palmitate	16	H_2O	27.5	g_i	(3)
Ethyl palmitate	16	H_2O	13	g_i	(3, 8)
Hexadecyl alcohol	16	H_2O	46		(6)
Palmitonitrile	16	H_2O	6.5	l	(5)
α-Bromopalmitic acid	16	dil. HCl	3	l	(5)
Hexadecylphenol	16	H_2O	55		(4)
Palmitic amide	16	H_2O	36		(5)
Palmitic aldoxime	16	H_2O	33.5		(5)
Hexadecylurea	16	H_2O	48.5		(5)

* State of expanded film, l = liquid, g_i = imperfect gas.

Evaporation in Two Dimensions, "Gaseous" Films

At very low "pressures," expansion to a "vapor state" occurs. Above areas of 5000 Å^2, the "pressure" obeys approximately the equation, $FA = 1.372T$ (F = "surface pressure," A, area per molecule in Å^2).

Between 5000 and 100 Å^2 the films behave either as "imperfect gases" or as "vapors" in contact with "liquid." There is a critical temperature for each substance below which there is a constant two-dimensional "vapor pressure," F_c ([7]).

"Surface Vapor Pressures" at 15°C

On dilute HCl		On water	
Substance	F_c dyne/cm ± *ca.* 0.02	Substance	F_c dyne/cm ± *ca.* 0.02
Tridecylic acid	0.30	Palmitonitrile	0.15
Myristic acid	0.19	Margaronitrile	0.105
Pentadecylic acid	0.11	Stearonitrile	0.035
Palmitic acid	0.04	Tetradecyl alcohol	0.12
		Hexadecyl alcohol	0.015

Films Adsorbed at the Surface of Aqueous Solutions

These are usually one molecule thick ([34]). The Gibbs equation may be written $\frac{\partial \log_e a_2}{\partial F} = \frac{A}{1.372T}$, where A is the area (in Å^2) which contains one adsorbed molecule, a_2 the activity of the solute (= its mole fraction in the case of ideal solutions), and F, the difference between the actual surface tension of the solution and that which it would have if adsorption could be prevented, usually taken as the surface tension of the pure solvent.

For the following substances, up to 5 dyne/cm, F obeys the equation $FA = 1.372T$ within 10% (phenol within 25%). From 10 to 30 dyne/cm, $FA = FB + 1.372T$ k, B being approximately the area filled by the molecules and k a constant for each substance, which is greater the less the cohesion between the adsorbed molecules.

Substance	Interface	B, Å^2 per molecule	k	Lit.
Phenol	H_2O or salt soln.-air	(19)	0.57	(22)
n-Butyric acid	H_2O-air	24.3	.73	(49, 50.5)
n-Valeric acid	H_2O-air	24.3	.63	(49, 50.5)
n-Caproic acid	H_2O-air	24.3	.43	(49, 50.5)
n-Capric acid	H_2O-air	24–25	.35	(49, 50.5)
Isoamyl alcohol	H_2O-air	22.4	.59	(49, 50.5)
tert.-Butyl alcohol	H_2O-Hg	24.0	.52	(49, 50.5)
Sucrose	H_2O-Hg	72.7	1.00	(49, 50.5)

Films of water adsorbed at the surface of salt solutions, where the salt raises the surface tension of the solvent are discussed in (21, 24).

Equilibrium data for fatty substances in bulk, in contact with films are given in (13).

Soap Films

The stable condition of laminae of sodium or potassium oleate solutions, with or without added glycerol or fluorescent dyes, is a stratified condition, the film being built up of superposed unit layers each of a thickness 50 ± 10 Å (30, 41, 59). The thinnest and most stable "black" soap film consists of one layer of this thickness, with excess liquid collected in droplets locally.

The electrical conductivity of soap solutions containing a small percentage of glycerol and potassium nitrate is the same as that of the liquid in bulk down to 120 Å thickness (44). In the absence of glycerol and potassium nitrate, the electrical conductivity increases at thicknesses $<$*ca.* 3000 Å and at 120 Å may be 4 to 8 times that of the liquid in bulk.

The surface tension of stable soap films is unchanged down to 120 Å thickness.

Miscellaneous

Thickness of the film of contamination required to affect the power of a surface to be wetted by water is approximately 10 Å (15).

Thickness of the vitreous layer produced on a calcite surface by polishing is 5 000–10 000 Å (12).

The minimum thickness of coherent celluloid films as determined optically is 10 to 15 Å (10); but the weight of thin celluloid films is much greater than corresponds to their "thickness" determined optically (33).

Rate of formation of tarnish films on metallic surfaces (54, 55).

Rate of combination of halogens with silver films (25).

Rate of passage of gas through collodion and soap films (16, 17).

The thickness of the film of Pt on a lead cathode which appreciably hinders electrolytic reduction is about 2 Å (53).

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77. Stahl und Eisen.
78. Transactions of the American Electrochemical Society.
80. Transactions of the American Institute of Mining and Metallurgical Engineers.
81. Transactions of the American Ceramic Society. (*Continued in 1917 by* No. 38.)
83. Transactions of the Faraday Society.
86. University of Illinois, Engineering Experiment Station. Bulletin.
87. Verhandelingen der koninklijke Akademie van Wetenschappen te Amsterdam.
89. Wissenschaftliche Abhandlungen der physikalisch-technischen Reichsanstalt.
92. Zeitschrift für angewandte Chemie.
93. Zeitschrift für anorganische und allgemeine Chemie. (*Name changed in 1915 from* Zeitschrift für anorganische Chemie.)
94. Zeitschrift für Krystallographie. (*Name changed in 1921 from* Zeitschrift für Krystallographie und Mineralogie.)
95. Zeitschrift für Metallkunde. (*Formerly* Internationale Zeitschrift für Metallographie.)
96. Zeitschrift für Physik. (Verhandlungen der physikalischen Gesellschaft zu Berlin, 1882–1898; Verhandlungen der deutschen physikalischen Gesellschaft, 1899–1902; Berichte der deutschen physikalischen Gesellschaft, 1903–1919; Zeitschrift für Physik, 1920– .)
100. Sprechsaal, Zeitschrift für die keramischen, Glas- und verwandten Industrien.
105. Journal of the Society of Glass Technology.
115. Engineering.
124. Silikat-Zeitschrift.
128. Journal of the Washington Academy of Sciences.
131. American Journal of Physiology.
132. Anales de la sociedad española de fisica y quimica.
133. British Association for the Advancement of Science, Reports.
134. Bulletin de l'académie des sciences de l'union des républiques soviétiques socialistes. (*Formerly* Bulletin de l'académie impérial des sciences de St. Pétersbourg; *name changed in 1917 to* Bulletin de l'académie des sciences de Russie; *present name dates from 1925*).
135. Chemical News and Journal of Industrial Science. (*Name changed in 1921 from* Chemical News and Journal of Physical Science.)
136. Chemiker-Zeitung.
137. Kongelige Danske Videnskabernes Selskab, Mathematisk-fysiske Meddelelser.
139. Ferrum.
141. Journal of Biological Chemistry.
142. Journal of the Society of Chemical Industry, Japan. (*Formerly* Journal of Chemical Industry, Japan.)
143. Journal of the Franklin Institute.
147. Meddelanden från K. Vetenskapakademiens Nobelinstitut.
149. Archives des sciences physiques et naturelles. (Bibliothèque britannique, 1796–1815; Bibliothèque universelle des sciences, belles-lettres et arts, 1816–1835; Bibliothèque universelle de Genève, 1836–1845; Supplément à la bibliothèque universelle de Genève. Archives des sciences physiques et naturelles, 1846–1847; Bibliothèque universelle de Genève. Archives des sciences physiques et naturelles, 1848–1857; Bibliothèque universelle, revue suisse et étrangère. Archives des sciences physiques et naturelles, 1858–1861; Bibliothèque universelle et revue suisse. Archives des sciences physiques et naturelles, 1862–1877; Bibliothèque universelle. Archives des sciences physiques et naturelles, 1878– .)
152. Carnegie Institution of Washington, Publications.

159. Science Reports of the Tôhoku Imperial University. Series I, Mathematics, Physics and Chemistry.
159B. Science Reports of the Tôhoku Imperial University. Series III, Petrology, Mineralogy and Mineral Deposits.
165. Bulletin internationale de l'académie des sciences de Cracovic. (*Name changed to* Bulletin internationale de l'académie Polonaise des sciences et des lettres.)
166. Science.
168. Communications from the Physical Laboratory at the University of Leiden.
169. Annales de l'Institut Polytechnique Pierre-le-Grand, Pétrograd.
171. Sitzungsberichte der Heidelberger Akademie der Wissenschaften. Mathematisch-naturwissenschaftliche Klasse. Abteilung A.
172. International Congress of Applied Chemistry.
173. Analyst, London.
176. Chemisch Weekblad, Amsterdam.
179. Nachrichten (Iswesti) des Polytechnikums, Petrograd.
180. Anzeiger der Akademie der Wissenschaften, Krakau.
181. Travaux de la société de physique et de chimie de Kharkoff.
182. Proceedings of the Chemical Society, London.
183. Annales de l'Institut électrotechnique Alexander III, Petrograd.
184. American Journal of Pharmacy.
185. Chemisches Centralblatt.
186. Bulletin de la classe des sciences, académie royale de Belgique.
187. Metall und Erz, Zeitschrift für Metalhüttenwesen und Erzbergbau, einschl. Aufbereitung.
188. Nachrichten von der königlichen Gesellschaft der Wissenschaften zu Göttingen. Geschaftliche Mitteilungen; mathematisch-physikalische Klasse.
189. Centralblätt für Mineralogie, Geologie und Paläontologie.
190. Neues Jahrbuch für Mineralogie, Geologie und Paläontologie.
190B. Neues Jahrbuch für Mineralogie, Geologie und Paläontologie, Beilage Band.
191. Bulletin de la société française de minéralogie.
192. Metallurgie. (*Divided into* Nos. 139 and 187.)
193. Mitteilungen der Naturforschenden Gesellschaft zu Halle.
194. Journal of the Science Association, Maharajah's College.
195. Sitzungsberichte der Dorpater Naturforscher-Gesellschaft an der Universität.
197. Proceedings of the National Academy of Sciences.
201. Proceedings of the Cambridge Philosophical Society.
202. Zeitschrift für physiologische Chemie.
203. Archiv für Anatomie und Physiologie. Physiologische Abteilung. *Merged with* No. 278.
204. Photographic Journal.
208. Physica, Nederlandsch Tijdschrift voor Natuurkunde.
210. Scientific Papers, Institute of Physical-Chemical Research, Tokyo.
213. Sitzungsberichte der mathematisch-physikalischen Klasse der Bayerischen Akademie der Wissenschaften zu München.
214. Kongelige Danske Videnskabernes Selskab, Skrifter naturvidenskabelig og mathematisk Afdeling.
216. Giornale di chimica industriale ed applicata. (Annali di chimica applicata, 1914; *continued as* Giornale di chimica applicata; *combined with* Giornale di chimica industriale, *March, 1920, to form* Giornale di chimica industriale ed applicata.)
223. Journal of General Physiology.
228. Denkschriften der kaiserlichen Akademie der Wissenschaften zu Wien, mathematisch-naturwissenschaftliche Klasse.
230. Biochemical Journal.
233. Pharmaceutisch Weekblad.
238. Travaux et mémoires du bureau international des poids et mesures.
242. Vierteljahrsschrift der naturforschenden Gesellschaft, Zürich.
245. Zeitschrift für das gesamte Schiess- und Sprengstoffwesen.
273. Berichte der deutschen pharmazeutischen Gesellschaft. *See also* No. 293.
278. Archiv für die gesamte Physiologie des Menschen und der Tiere. (Pflüger.)
285. Journal of Mathematics and Physics.
286. Chemical Reviews, Baltimore.
287. Kolloidchemische Beihefte.
288. Revue générale des colloides et de leurs applications industrielles.
289. Journal of Physiology.
292. Proceedings and Transactions of the Nova Scotian Institute of Science.
293. Archiv der Pharmazie. (*Combined with* No. 273 *in 1924 to form* Archiv der Pharmazie und Berichte der deutschen pharmazeutischen Gesellschaft.)
308. Fortschritte der Mineralogie, Kristallographie und Petrographie.
320. Journal of Analytical and Applied Chemistry. *Merged into* No. 1 *in 1893.*
322. Schriften der Dorpater Naturforscher-Gesellschaft an der Universität.
323. Jahrbuch der königlichen kaiserlichen geologischen Reichsanstalt.
324. Canadian Chemistry and Metallurgy.
325. Proceedings of the Royal Institution of Great Britain.
345. Bulletin des sciences pharmacologiques.
347. Pharmaceutical Journal and Pharmacist.
356. Journal of the Royal Society of Arts.
362. Chemické Listy pro vedu a prumysl.
426. Acta Societatis Fennicae. (1839–1842, Commentationes Societatis Fennicae.)
429. Memoirs of the College of Science, Kyoto Imperial University. (*Before 1914 was part of* Memoirs of the College of Science and Engineering, Kyoto Imperial University.)
432. Transactions of the Institution of Mining and Metallurgy (London).
445. Zeitschrift des Vereins der deutschen Zucker-Industrie. (*Before 1898 was* Zeitschrift des Vereins für die Rubenzucker-industrie.)
451. Memoirs of the College of Engineering, Kyoto Imperial University. *See* No. 429.
453. Proceedings of the Iowa Academy of Science.
455. Journal of the Chemical, Metallurgical and Mining Society of South Africa.
464. United States Public Health Service. Hygienic Laboratory Bulletins.
469. Bulletin of the Institute of Physical and Chemical Research, Tokyo.
476. Giornale di farmacia, chimica e di scienze affini.
477. Journal of the American Medical Association.
478. Bulletin de l'association des chimistes de sucrerie et de distillerie de France et des colonies.
479. Memoirs of the College of Science and Engineering, Kyoto Imperial University. (*Divided in 1914 into* Nos. 429 and 451.)
480. Chemical Trade Journal and Chemical Engineer.
481. Tschermak's mineralogische und petrographische Mitteilungen.
482. Quarterly Journal of the Indian Chemical Society.

485. Teknisk Tidskrift. Upplaga C. Kemi och Bergsvetenskap.
490. Atti e memorie della r. accademia di scienze, lettere ed arti in Padova.
492. Bulletin of the U. S. Dept. of Agriculture, Bureau of Soils.
493. Kali (Zeitschrift für Gewinnung, Verarbeitung und Verwertung der Kalisalze).
508. Rivista di mineralogia e cristallografia italiana.
B3. Landolt-Börnstein, Physikalisch-chemische Tabellen. 5th ed. Berlin, Springer, 1923.
B50. Gmelin-Kraut's Handbuch der anorganischen Chemie Heidelberg, Winter, 1906– .
B51. Seidell, Solubilities of Inorganic and Organic Substances New York, Van Nostrand, 1919.
B56. Onnes, Festschrift, Leiden, 1922.
B57. Tammann, Krystallizieren und Schmelzen. Leipzig, Barth, 1903.
B80. Mulder, Bijdragentol de geschiedenis van het scheikundig gebonden water. Rotterdam, 1864.

PASTE ON INSIDE COVER

Key Numbers of Elements

Ag	Al	As	Au	B	Ba	Be	Bi	Br	C	Ca	Cb	Cd	Ce	Cl	Co	Cr	Cs	Cu
32	55	13	33	54	79	75	15	5	16	77	51	29	59	4	44	4[illegible]	85	31

Dy	Er	Eu	F	Fe	Ga	Gd	Ge	Gl	H	Hf	Hg	Ho	I	In	Ir	K	La	Li	Lu
67	69	64	3	43	25	65	20	75	2	73	30	68	6	26	36	83	58	81	72

Mg	Mn	Mo	N	Na	Nb	Nd	Ni	O	Os	P	Pb	Pd	Pr	Pt	Ra	Rb	Rh	Ru	S	Sa
76	42	47	11	82	51	61	45	1	35	12	23	41	60	37	80	84	40	39	8	63

Sb	Sc	Se	Si	Sn	Sr	Ta	Tb	Te	Th	Ti	Tl	Tm	U	V	W	Y	Yb	Zn	Zr
14	56	9	18	22	78	52	66	10	24	19	27	70	49	50	48	57	71	28	21

ERRATA

VOLUME I

PAGE

184 No. 481. *For* $CH_3.CH:NOH$ *read* $(CH_3)_2C:NOH$.

185 No. 569. *For* Furfural *read* Furfurane.

201 No. 1575. *For* $(CH_3CHOHCO)_2$ *read* $(CH_3CHOHCO)_2O$.

236 Nos. 3727, 3728, 3728.1. *For* *o*-, *m*-, *p*-$CH_3(CH_2)_2C_6H_4CH_3$ *read* *o*-, *m*-, *p*-$(CH_3)_2CHC_6H_4CH_3$, respectively.

298 Neurine perchlorate, 1104. *Delete item.*

PAGE

375 GERMANY. Hessen and Adjoining Regions, Lit. Column. *For* (41) *read* (42). (Occurs twice).

376 JAPAN. Second line from bottom. *For* Mikko-Yumoto *read* Nikko-Yumoto.

377 N. Naëgite. *For* [Japan] (42) *read* [Japan] (41).

381 Japan. Lit. Column. *For* (42) *read* (41).

381 (41) Ishizu, *After* "*The Mineral Springs of Japan*" *insert* Imp. Hygieni. Lab., Tokyo.

ERRATA

VOLUME II

PAGE

86 ELECTRICAL RESISTIVITY. Zirconia. *For* 12×10^7 *read* 1.2×10^3.

130 Second equation. *For* 0.08 *read* 0.08*A*.

131 TABLE *B*. First Column, eighth line from bottom. *For* Japan, Chihuko *read* Japan, Chikuho.

PAGE

235 **CORDAGE FIBERS.** *After* RELATIVE STRENGTHS *insert* OF TWISTED THREAD OR ROPE.

236 PHYSICAL PROPERTIES. Third column. *After* Breaking strain per strand, *for* g *read* gr.

ERRATA

VOLUME III

PAGE

11 *Above* $\mathbf{NH_3}$, Ammonia *insert* **NO,** Nitric oxide, *v.* p. 14.

43 FIG. 1. *Add* (2.5) Andrews, 5, **40**: 544; 86 *and* (43.5) Sawyer, *Proc. Maine Soc. Civil Eng.*, **1**: 27; 11.

79 **NaOH** at 30°C, 22% solution. *For* 1.2454 *read* 1.2354.

164 *No.* 570. *For* ${}^t{}_4$ = *read* d^t_4 =

PAGE

205 Column I. *Interchange symbols* W *and* Tl.

259 $\mathbf{H_2S}$. Second, fourth, and sixth columns. *For* $10^{-6} \times K$ read $10^{-4} \times K$.

264 $\mathbf{N_2O_4}$. Column 3. *For* 78.5 *read* 87. Column 4. *For* 0.016 *read* 0.017.

311 $\mathbf{N_2O_4}$ B = $\mathbf{HNO_3}$. *For* 78.5 *read* 87.

DATE DUE / DATE DE RETOUR
